Location Hydraulic Report

DRAFT ENVIRONMENTAL IMPACT STATEMENT

FPIN: 410981-2-28-01
FAP:

Florida Department of Transportation
District Three
1074 Highway 90 East
Chipley, Florida 32428

Federal Highway Administration
Florida Division
545 John Knox Road, Suite 200
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August 2013

Location Hydraulic Report

Gulf Coast Parkway

From

US 98 in Gulf County

To

US 231 in Bay County

Prepared for FDOT District 3

FPIN: 410981-2-28-01

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LIST OF ACRONYMS

CFR	Code of Federal Regulations
CR	County Road
ERP	Environmental Resource Permit
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
ICWW	Intracoastal Waterway
IDC	Intermodal Distribution Center
LRTP	Long Range Transportation Plan
NAVD	North American Vertical Datum
NFIP	National Flood Insurance Program
NRCS	Natural Resource Conservation Service
PD&E	Project Development and Environment
SR	State Road
TAFB	Tyndall Air Force Base
USGS	United States Geological Survey

SECTION 1 INTRODUCTION

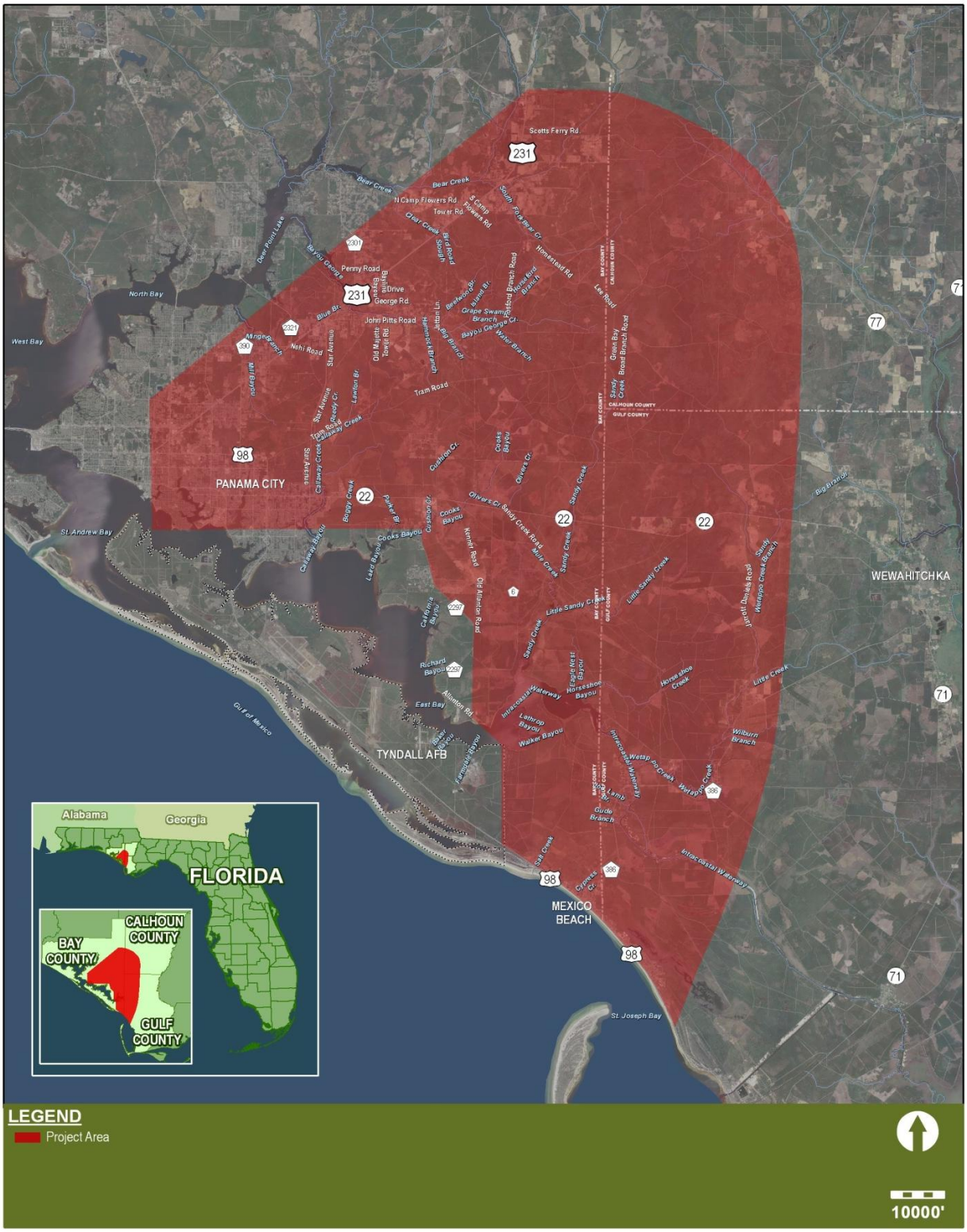
The Federal Highway Administration (FHWA), in cooperation with the Florida Department of Transportation (FDOT), is considering the addition of a new link in the transportation network of the central Panhandle of Florida. This new link, known as the Gulf Coast Parkway (GCP), would provide a connection between US 98 in Gulf County and US 231 and US 98 (Tyndall Parkway) in Bay County, Florida (**Figure 1-1**). The proposed roadway would use a combination of existing and new alignment within a 168-foot to 250-foot wide right-of-way. The right-of-way widths will allow for expansion of the road to a four-lane, divided roadway, when traffic demand warrants. In the rural areas the 250-foot right-of-way width will accommodate the construction of a 12-foot wide multi-use trail. In the urban areas a curb and gutter section with bike lanes and paved sidewalks will be constructed. The project length varies depending on the alternative alignment, but is generally between 30 and 33 miles long.

1.1 PURPOSE

This Location Hydraulics Report is one of several reports prepared as part of the Project Development and Environment (PD&E) Study. The report has been prepared to assess the floodplain encroachments for each alignment alternative for the proposed GCP. This study is required by 23 Code of Federal Regulations (CFR) 650A, Sec. 650.111 and has been prepared in accordance with Chapter 24 of the FDOT PD&E Manual.

The project is located in the Florida Panhandle within the southern part of Bay and Gulf Counties between Panama City and Wewahitchka. The project is located within Townships 3, 4, 5, and 6 South and Ranges 11, 12, and 13 West. The project alignment extends from US 98 at Mexico Beach to US 231 north of Panama City.

Figure 1-1 Project Location and Study Area Map



SECTION 2 PROJECT DESCRIPTION

The purpose for GCP is to 1) enhance economic development in Gulf County through provision of direct access to major transportation facilities (regional freight transportation routes and intermodal facilities); improved mobility; and direct access to tourist destinations in south Gulf County; 2) improve mobility within the regional transportation network by providing a new connection to existing and future transportation routes consistent with the Bay County Long Range Transportation Plan (LRTP) and the Gulf County Comprehensive Plan; 3) improve security of the Tyndall Air Force Base (TAFB) by providing a shorter detour route; and 4) improve hurricane evacuation for residents of coastal Gulf County by providing an additional evacuation route.

2.1 EXISTING ROADWAY FACILITIES

The proposed GCP is a new facility on a combination of existing and new alignments. The typical sections for existing roadways in the study area that may be utilized as part of the GCP alternatives are described below.

County Road (CR) 386 from US 98 south of Mexico Beach to Wetappo Creek is a two-lane rural undivided roadway with one 12-foot travel lane and a 5-foot grass shoulder in each direction, except in the area within approximately 1,200 feet on each side of the Intracoastal Waterway (ICWW) bridge, where 12-foot travel lanes and 9-foot shoulders (with 4-foot paved) are provided. The roadway is centered within the existing right-of-way which has a minimum width of 100 feet.

(State Road {SR} 22) from Star Avenue (CR 2315) to SR 71 in Wewahitchka is a two-lane rural undivided roadway with one 12-foot travel lane and a 12-foot shoulder (5-foot paved) in each direction. The roadway is centered within the existing right-of-way which has a minimum width of 100 feet.

US 98 south of CR 386 near Mexico Beach is a two-lane rural undivided roadway with one12-foot travel lane and a 9-foot shoulder (5-foot paved) in each direction. The right-of- way north of the centerline varies from 30 to 100 feet, and the right-of-way south of the centerline varies from 33 to 64 feet. The speed limit for this roadway section is 35 mph.

US 98 (SR 30A/Tyndall Parkway) in Springfield is a four-lane urban divided roadway with two 12-foot travel lanes in each direction, separated by a 28-foot raised grass median. The roadway is centered within the existing right-of-way which has a minimum width of 80 feet. The speed limit for this roadway section is 45 mph.

US 231 in the vicinity of Star Avenue (CR 2315) and College Station is a four-lane rural divided roadway with two 12-foot travel lanes in each direction, separated by a 40-foot depressed grass median. The roadway has 8-foot inside shoulders and 10-foot outside shoulders (4-foot paved), and is centered within a right-of-way width of 224 feet. The speed limit for this roadway section is 55 mph.

Star Avenue (CR 2315) from SR 22 to US 231 is a two-lane rural undivided roadway with one 11-foot travel lane and a 5-foot grass shoulder in each direction. The roadway is centered within the

existing right-of-way which has a width of 100 feet. The speed limit for this roadway section is 45 mph.

Tram Road (CR 101) from US 98 (SR 30A) to the Clifford Chester Sims State Veteran's Nursing Home facility approximately 1,500 feet east of US 98 is a two-lane rural undivided roadway with 12-foot travel lanes and 6-foot paved shoulders. The roadway is centered within the existing right-of-way which has a width of 100 feet. From approximately 1,500 feet east of US 98 to Star Avenue (CR 2315) Tram Road is an unpaved roadway. The speed limit for this roadway section is 35 mph.

Nehi Road extends from Star Avenue (CR 2315) to US 231 and is an unpaved roadway within these limits, except for the approximately 2,000 foot segment from the Bay County correctional facility to Cherokee Heights Road where the roadway has one 12-foot travel lane in each direction. The speed limit for this roadway section varies between 25 and 30 mph.

2.2 EXISTING ROADWAY DRAINAGE

Of the several alternative alignments evaluated for this project, only short sections are along existing roadways. Approximately 7.3 miles of SR 22, and 6.5 miles of CR 386 are within some of proposed alignments. Appropriate maintenance personnel were contacted to determine if there are hydraulic inadequacies with existing structures. Email correspondence with Harvey Brewton, FDOT Maintenance Engineer, Panama City, indicated that Sandy Creek Bridge on SR 22 has experienced flooding and may need more hydraulic capacity.

2.3 ALTERNATIVES

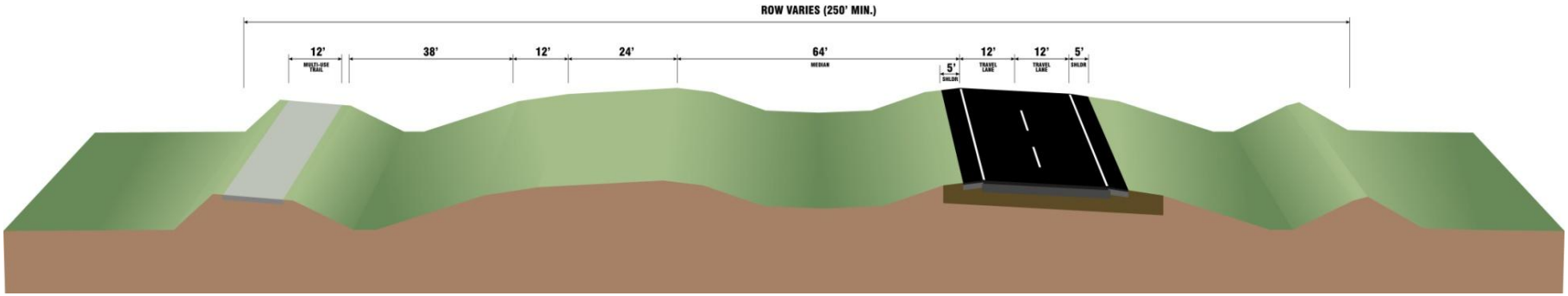
Although the PD&E Study evaluated alternatives such as No-Build, Transportation System Management, and Multi-modal, this report addressed only the Build Alternatives. The proposed typical section for the Build Alternatives in the design year (2032) is a four-lane divided roadway with stormwater management and bicycle and pedestrian facilities. The configuration of the typical section depends upon its location. The rural arterial typical section includes four 12-foot lanes with a five-foot outside shoulder and two-foot inside shoulder, separated by a 64-foot median in 250 feet of right-of-way. Included in the rural arterial typical section is a 12-foot paved multi-use trail to one side (**Figure 2-1**). The four-lane high-speed urban arterial section includes four 12-foot lanes with 6.5-foot bicycle lanes in the outside shoulders and four-foot paved inside shoulders, separated by a 46-foot median in 168 feet of right-of-way. This is a curb and gutter section with five-foot paved sidewalks on each side of the roadway (**Figure 2-2**). The bridge typical sections are shown in **Figures 2-3 and 2-4**.

Initially, the project will require only two 12-foot lanes within either typical section; however, the additional right-of-way is being obtained in order to provide for future expansion when needed. The proposed design speed is 65 mph for the rural roadway, and 50 mph for the urban roadway.

Five build alternative alignments have been identified for consideration. These five alignments, Alternatives 8, 14, 15, 17, and 19, are shown in **Figure 2-5** and are described in **Table 2-2**. For a summary of the alternatives development process please refer to Section 2 of the Draft Environmental Impact Statement.

Figure 2-1: Proposed Rural Arterial Typical Section

Interim Rural Typical



Ultimate Rural Typical

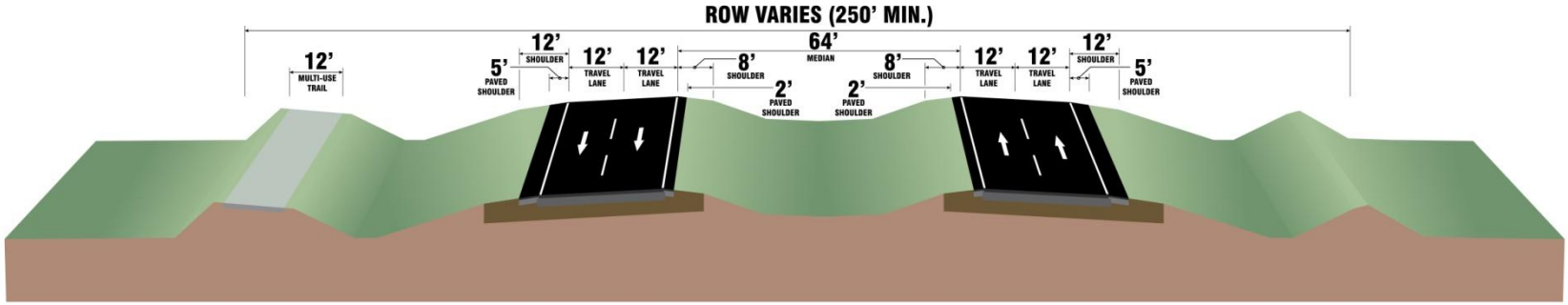
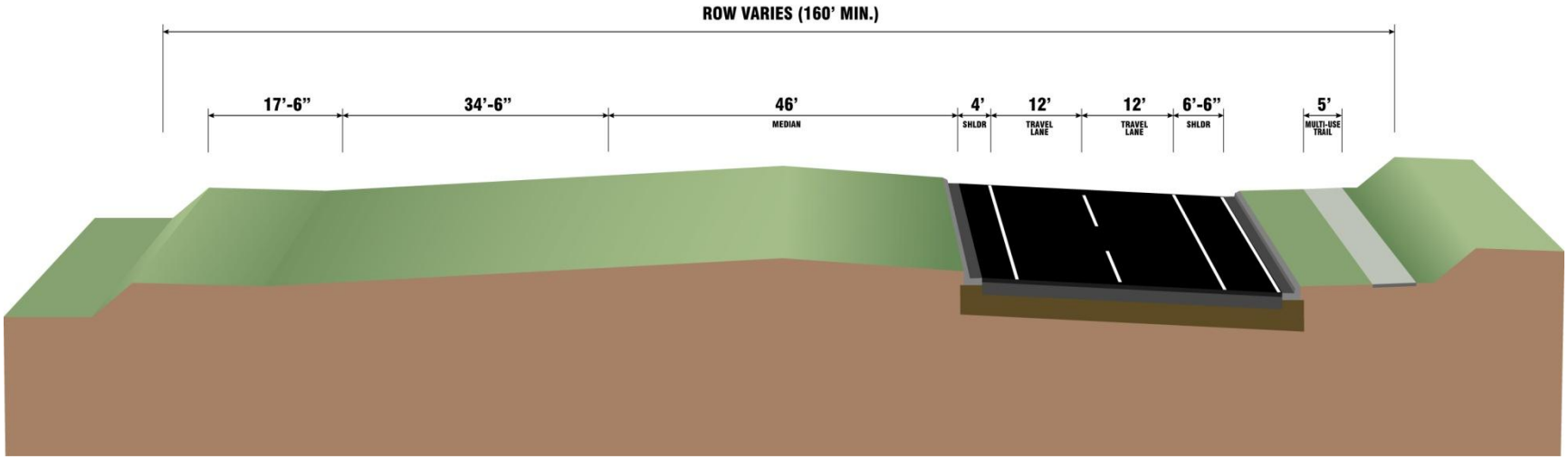


Figure 2-2: Proposed Urban Arterial Typical Section

Interim Urban Typical



Ultimate Urban Typical

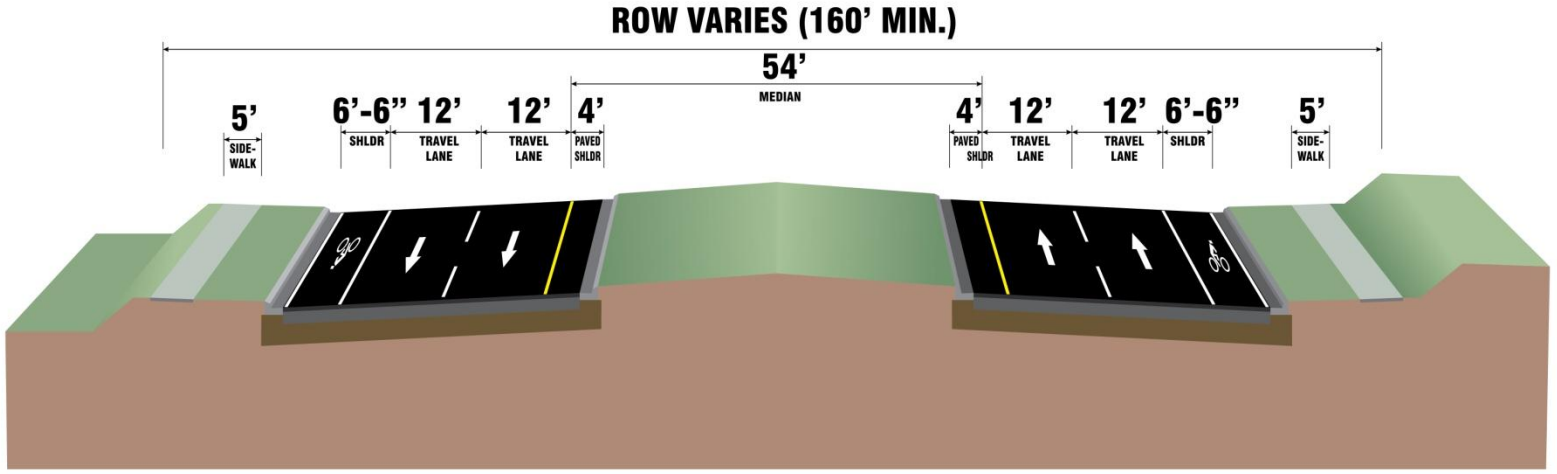
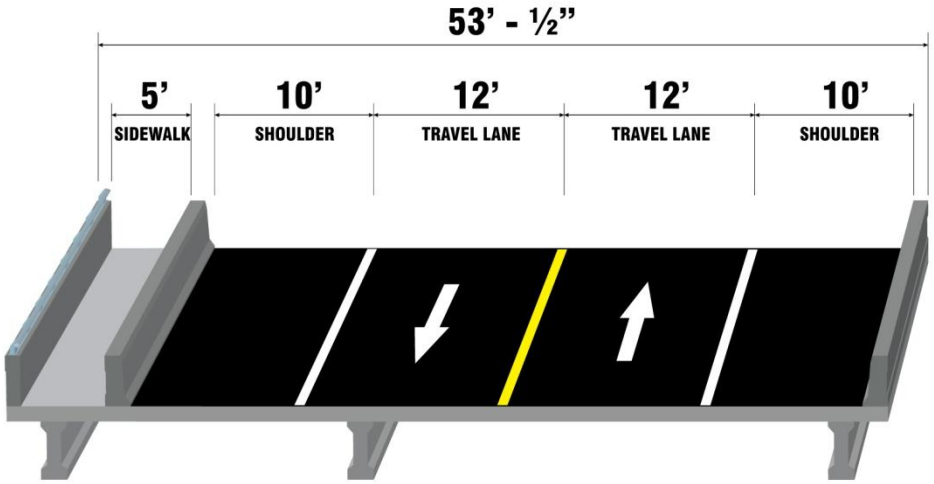


Figure 2-3: Proposed Interim Bridge Typical Sections

Interim Urban Bridge Typical



Interim Rural Bridge Typical

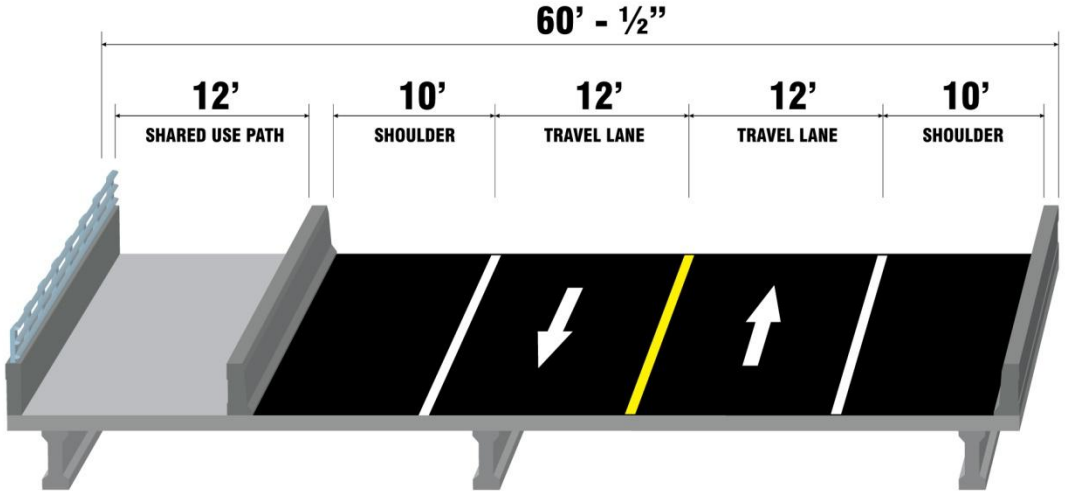
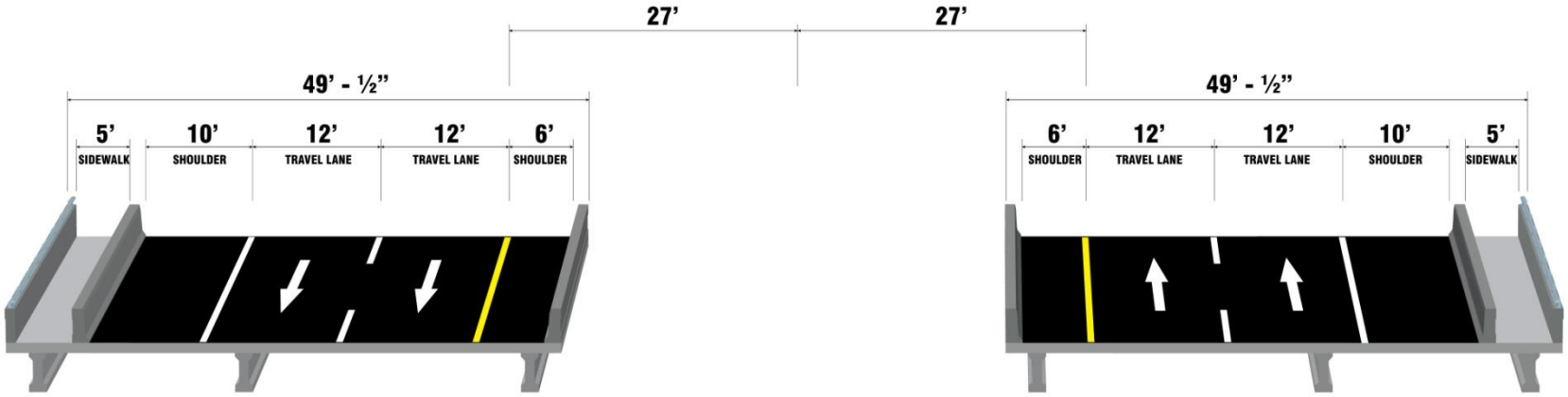


Figure 2-4: Proposed Ultimate Bridge Typical Sections

Ultimate Urban Bridge Typical



Ultimate Rural Bridge Typical

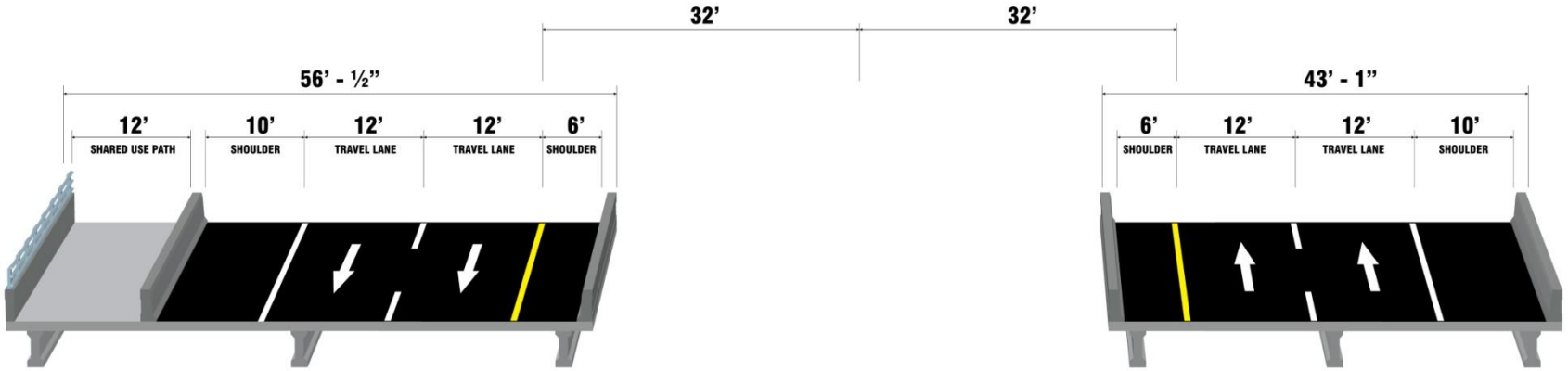


Figure 2-5 Gulf Coast Parkway Build Alternatives

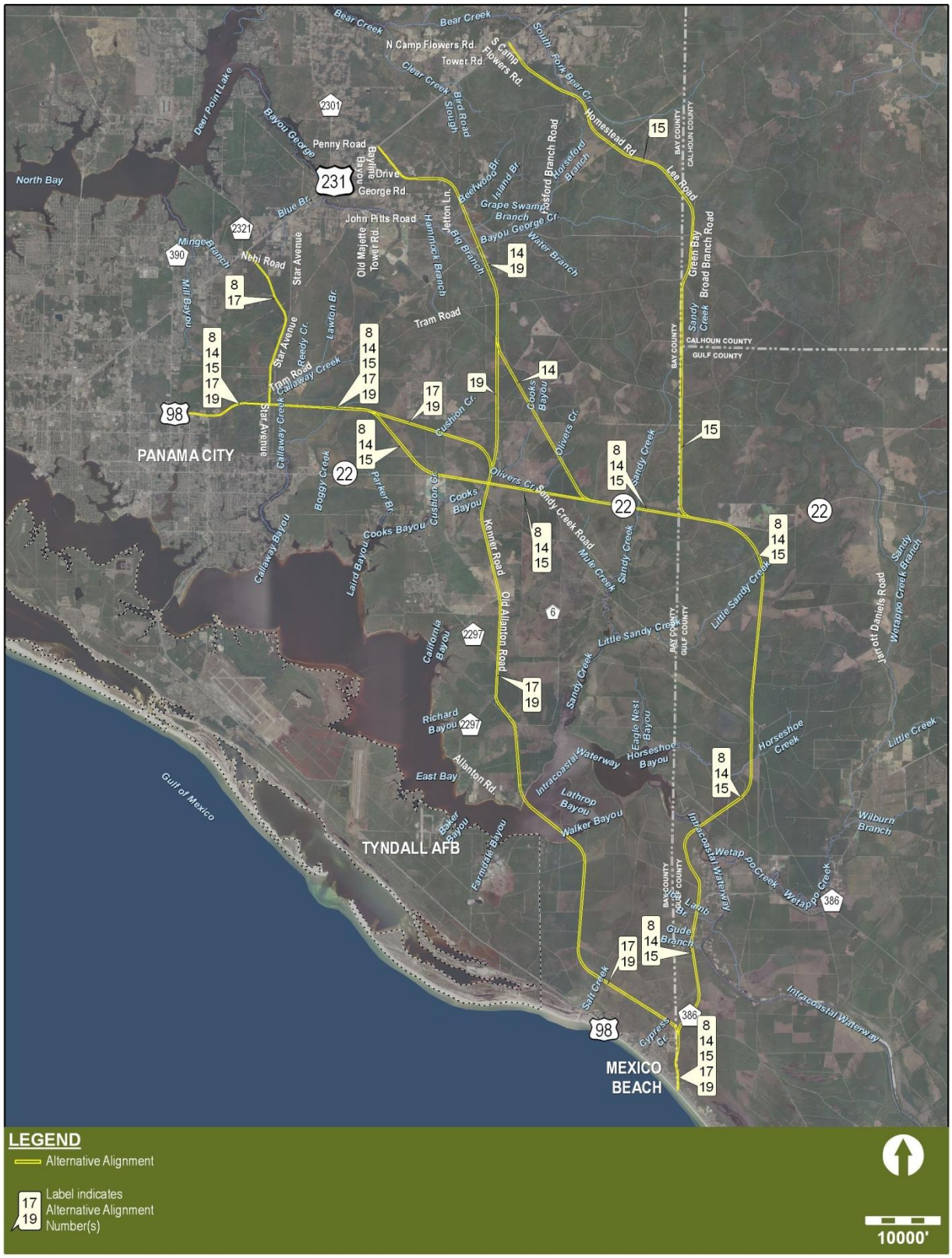


Table 2-2: Description of the Gulf Coast Parkway Build Alternatives

Alternative	Description
8	From the intersection of US 98 and CR 386, Alternative 8 follows CR 386 north utilizing the urban typical section to North 15th Street. From there it transitions to a rural typical section, continuing north along existing CR 386 for approximately 3 miles where it deviates from CR 386. Proceeding north on new alignment for a total of approximately 8.5 miles, Alternative 8 crosses the ICWW and Wetappo Creek on a new high-level bridge, and continues north to intersect SR 22 approximately 11.4 miles east of Callaway. From there the alignment travels west along existing SR 22 for approximately 6.5 miles where it turns northwest and then west on new alignment for approximately 5.0 miles to intersect Star Avenue about 0.3 mile south of Tram Road. From Star Avenue, Alternative 8 transitions to an urban typical section which is carried through to both termini locations. The alternative's through movement continues west on new alignment for approximately 0.7 mile to merge with and follow existing Tram Road for approximately 0.5 mile. It then turns west and continues on new alignment to end at a new intersection with US 98 (Tyndall Parkway). Additionally, the less dominant leg of Alternative 8 proceeds north along existing Star Ave. approximately 2.2 miles until the intersection with Nehi Road where it follows mostly along Nehi Road to the northwest to end at a new intersection with US 231 in the vicinity of the existing CR 2321/US 231 intersection.
14	From the intersection of US 98 and CR 386, Alternative 14 follows CR 386 north utilizing the urban typical section to North 15th Street. From there it transitions to a rural typical section, continuing north along existing CR 386 for approximately 3 miles where it then deviates from CR 386 alignment. Proceeding north on new alignment for a total of approximately 8.5 miles, Alternative 14 crosses the ICWW and Wetappo Creek on a new high-level bridge, and continues north to intersect SR 22 approximately 11.4 miles east of Callaway. From there the alignment travels west along existing SR 22 for approximately 2.5 miles where it splits. To connect with US 98 (Tyndall Parkway), the alignment continues west on SR 22 for approximately 4.0 miles where it turns northwest and then west to intersect Star Ave. about 0.3 mile south of Tram Road. From Star Ave., Alternative 14 transitions to an urban typical section and continues west 0.7 mile to merge with and follow existing Tram Road for approximately 0.5 mile. It then turns west and continues on new alignment to end at a new intersection with US 98 (Tyndall Parkway). To connect with US 231, Alternative 14 after splitting from SR 22 proceeds northwest on new alignment for approximately 8.0 miles where it turns to the west and continuing on new alignment, travels south of and parallel to the Port of Panama City Intermodal Distribution Center (IDC) and Conservation Boundary. It then transitions to an urban typical section and proceeds northwest to intersect with the planned entrance roadway for the IDC which intersects with US 231.
15	From the intersection of US 98 and CR 386, Alternative 15 follows CR 386 north utilizing the urban typical section to North 15th Street. From there it transitions to a rural typical section, continuing north along existing CR 386 for approximately 3 miles where it then deviates from the CR 386 alignment. Proceeding north, on new alignment for a total of approximately 8.5 miles, Alternative 15 crosses the ICWW and Wetappo Creek on a new high-level bridge, and continues north to intersect SR 22 approximately 11.4 miles east of Callaway. From there Alignment 15 has two options depending on the desired terminus. To connect with US 98 (Tyndall Parkway), Alternative 15 travels west along existing SR 22 for approximately 6.5 miles where it turns northwest and then west on new alignment for approximately 5.0 miles to intersect Star Ave. about 0.3 miles south of Tram Road. From Star Ave., Alternative 15 transitions to an urban typical section and continues west on new alignment for approximately 0.7 mile to merge with and follow existing Tram Road for approximately 0.5 mile. It then turns west and continues on new alignment to end at a new intersection with US 98 (Tyndall Parkway). Alternately, from SR 22, Alternative 15 continues across SR 22, traveling north then northwest on new alignment for approximately 14.0 miles, transitioning back to an urban typical section just before it ends at a new intersection with US 231 near Campflowers Road.
17	From the intersection of US 98 and CR 386, Alternative 17 follows CR 386 utilizing the urban typical section to North 15th Street. From there, it transitions to a rural typical section and continues north along existing CR 386 for approximately 0.5 mile where it then turns west and travels on new alignment for 3.0 miles. The alignment veers to the north for approximately 2.5 miles and then utilizing a new high level bridge crosses over East Bay and the ICWW. The alignment returns to grade on Allanton Point and continues to the north mostly along existing Allanton/Old Allanton Road until it reaches SR 22. After crossing SR 22, the road would travel north then west on new alignment for approximately 5.3 miles to connect at an intersection with Star Ave. about 0.3 mile south of Tram Road. From the intersection at Star Ave., Alternative 17 transitions to an urban typical section and has two termini locations. The alternative's through movement continues west on new alignment for approximately 0.7 mile until it merges with existing Tram Road. From there it travels along existing Tram Road for approximately

Alternative	Description
	0.5 mile and then turns to the west on new alignment to end at a new intersection with US 98 (Tyndall Parkway). Additionally, the alternative travels north along existing Star Ave. approximately 2.2 miles until the intersection with Nehi Road where if follows mostly along Nehi Road to the northwest to end at a new intersection with US 231.
19	From the intersection of US 98 and CR 386, Alternative 19 follows CR 386 utilizing the urban typical section up to North 15th Street. From there it transitions to a rural typical section and continues north along existing CR 386 for approximately 0.5 mile where it then turns west and travels on new alignment for approximately 3.0 miles. The alignment veers to the north for approximately 2.5 miles and then, utilizing a new high level bridge crosses over East Bay and the ICWW. The alignment returns to grade on Allanton Point and continues to the north mostly along existing Allanton/Old Allanton Road until it reaches SR 22. After crossing SR 22, the road has two options. One would turn west to travel on new alignment for approximately 5.0 miles to intersect with Star Ave. about 0.3 mile south of Tram Road. From the intersection at Star Ave., Alternative 19 transitions to an urban typical section, continues west 0.7 mile to merge with and follow Tram Road for approximately 0.5 mile and then turns to the west on new alignment to end at a new intersection with US 98 (Tyndall Parkway). Alternately, Alignment 19 would continue north on new alignment for approximately 6.2 miles where it turns to the west, continuing on new alignment along the south property line of the Port of Panama City IDC and its Conservation Boundary. It then transitions to an urban typical section and turns to the northwest to intersect with the planned entrance roadway for the IDC which intersects with US 231.

SECTION 3 EXISTING CONDITIONS

Portions of all the project alignments drain to East Bay and tributaries of East Bay. Portions of some of the alignments drain to Bayou George Creek and the South Fork of Bear Creek. Bayou George Creek and Bear Creek contribute to Deer Point Lake.

3.1 TOPOGRAPHY

The topography for the project area is relatively flat with elevations near sea level at the coast and up to elevation 35 further inland. Most of the project area is wooded, with some areas used for tree harvesting. All segments will cross several wetlands and floodplains associated with East Bay and its tributaries.

3.2 SOILS

Soils are predominantly sandy with high seasonal high water table. The majority of the project area is hydrologic soil group D. Based on Natural Resource Conservation Service (NRCS) soil survey, soils in the upland areas are a mixture of Leefield , Albany , Stilson and Chipley Sands. These soils are poorly to moderately well drained soils with the groundwater approximately 1.0 to 3.0 feet below existing ground.

In the flatwoods soils are mostly Plummer and Pelham Sands with some Pottsburg, Leon and Rutlege Sands. These areas are nearly level with poorly to very poorly drained soils. The groundwater is approximately zero to 1.5 feet below existing ground. In these areas there could also standing water up to 2 feet above ground.

In the low lying areas the predominate soils are Pamlico-Dorovan complex, Rutlege and Allanton Sands and Pickney Fine Sand. These areas are nearly level and poorly drained. In most of these areas groundwater will be above existing ground as much as 2 feet.

3.3 FLOODPLAINS

The applicable Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) are listed and shown in Appendix A. These and the Bay and Gulf County Flood Insurance Studies indicate that numerous portions of the alternative alignments traverse FEMA mapped floodplains. The floodplains in close proximity to East Bay are storm surge related and have a base flood elevation of 8.0 ft (North American Vertical Datum {NAVD} 88). Inland the floodplains are a mix of Zone AE and A. Zone A has no base flood elevation determined whereas Zone AE does. Several alignments run through the Bayou George watershed and the Callaway Creek watershed.

3.3.1 Floodways

A FEMA Regulatory Floodway is the channel of a river or other watercourse and the adjacent land that must be reserved in order to discharge the base flood without increasing the water

surface elevation more than a designated height. Development in these floodways must be regulated to ensure that there is no increase in upstream flood elevations.

Along this project portions of Bayou George Creek and Callaway Creek are designated FEMA floodways. Appendix A includes a figure showing these floodways. Some of the proposed alignments are near Bayou George Creek but never cross the floodway portion of it. A small portion of the project crosses the floodway associated with Callaway Creek in Alternative Alignments 8 and 17. The floodway is approximately 250 feet wide at the crossing.

SECTION 4 REGULATORY REQUIREMENTS

4.1 FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP)

Chapter 62-346 Florida Administrative Code (Environmental Resource Permitting in Northwest Florida). The rule contains requirements for stormwater quality and attenuation and floodplain impacts. Concerning floodplains, projects shall not cause a net reduction in storage within the 10-year floodplain except for traversing works. Roadways have been considered traversing works so only the stormwater ponds fall under this requirement. Traversing works such as roadways shall cause no more than a one foot rise in the 100-year flood elevation immediately upstream, and no more than one tenth of a foot rise 500 feet upstream.

4.2 FDOT

Drainage Manual (Chapter 4):

- The design of all cross drain structures shall be analyzed for the Design Flood (50-year frequency flood), Base Flood (100-year frequency flood) and the Greatest Flood (overtopping flood or the 500-year frequency flood where overtopping is not practicable) that can be expected to flow to the structure.
- The hydraulic design of cross drains shall comply with 23 CFR 650, Subpart A, and the National Flood Insurance Program (NFIP).
- Any increase in backwater shall not significantly change land use values, unless flood rights are acquired.
- The backwater for design frequency conditions shall be kept at or below the travel lane.

4.3 LOCAL GOVERNMENT

This project is predominantly in Bay County. The only portions of the project in Gulf County are existing roadways.

In general, meeting the requirements for the Environmental Resource Permit (ERP) and FDOT Chapter 14-86 will satisfy the County's requirements defined in the Bay County Land Development Code Chapter 24 – Drainage/Stormwater Management.

4.4 FEMA

NFIP regulations at Title 44
CFR Parts 60 and 65

SECTION 5 EVALUATION OF HYDRAULIC STRUCTURES

The following approach is felt to provide a reasonable comparison of alternative alignments, but a much more refined effort using site specific topographic data will need to be done during the design phase to determine the size of the hydraulic structures. During the design phase, the structures will be developed in accordance with FDOT's drainage standards and as such the impacts to floodplains will be minimized.

United States Geological Survey (USGS) Quadrangle maps and Aerial images were used to delineate drainage basins and to determine floodplain encroachment locations where cross drains would be needed. Straight Line Diagrams for Bay and Gulf Counties were used to determine existing cross drain locations and sizes along existing alignments. No flow rate analysis was performed on high-level bridges that would be tidally influenced and subject to navigational horizontal and vertical clearance requirements. Region C Regression Equations were used to estimate a 50 year design flow rate for watersheds between 0.92 square miles and 4384 square miles.

Once flow rates were estimated, bridge lengths and culvert sizes were estimated. Appendix C summarizes the technical approach.

Below is a summary of the bridges and culverts required for each alternative alignment.

Table 5-1 Bridges/Culverts Required By Alternative Alignment

Alignment	Number of HL Bridges	Total Length of HL Bridges (ft)	Number of LL Bridges	Total Length of LL Bridges (ft)	Number of Box Culverts	Number of Small Culverts
8	1	~ 7000	10	1796	12	19
14	1	~ 7000	12	2071	16	24
15	1	~ 7000	12	6384	14	26
17	1	~ 9100	4	1626	3	13
19	1	~ 9100	6	1901	5	19

Notes:

1. HL = High Level, LL = Low Level
2. Bridge estimates include existing bridges assuming they will be rebuilt to current standards.
3. Small culverts are culverts estimated to single 54" pipes or less. The number of small culverts per alignment is an estimate and there could be more.
4. The estimated number of encroachments is obtained by adding the number of bridges, box culverts, and small culverts. Alignment 17 has the least encroachments with 21. Alignments 14 and 15 have the most with 53.

Appendix D contains the conceptual bridge lengths and structure size for each alignment. The high level bridge lengths are based on considerations such as roadway geometry and environmental factors and are not based on hydraulic constraints. Final bridge lengths could be longer or shorter, depending upon wetland limits and topography. Specific site conditions will be

considered in the bridge hydraulic reports and bridge development reports that document final design.

Scour will be evaluated during the final design phase. At this stage of evaluation, scour is not expected to be a significant issue. Most drainage ways are relatively small tributaries or streams. Flow rates and depths are expected to be small; therefore, scour should not be significant. The high level crossings over East Bay and the Intracoastal Waterway may require coastal storm surge hydraulic evaluations during the design phase to determine flow rates and scour. Given that these structures are a substantial hydraulic distance from the Gulf of Mexico, effects of the storm surge should be dampened; therefore, it is not expected that velocities and scour will be significant.

SECTION 6 FLOODPLAIN IMPACTS

All of the alignments have transverse crossings of the floodplains. There is no practical way to avoid the crossings because there are so many and the roadway standards require gradual curves. Preliminary evaluations were preformed to estimate the structure size for the floodplains having large watersheds. For these floodplains and those with smaller watersheds, the hydraulic structures will be sized during design to meet FDOT's drainage standards and as such the impacts to floodplains will be minimized.

Two longitudinal encroachments were identified based on overlay of the alignments on USGS quadrangle maps. In these areas, it is assumed that bridges will be used to span the encroachments. These longitudinal encroachments are noted below and are shown in Appendix E. During design when field survey is available and detailed hydraulic evaluations are done, it may be determined that these are not encroachments because the floodplain limits will be more accurately defined. Furthermore, these encroachments may be avoided by minor shifts in alignment during the design phase when the floodplain is more accurately defined.

Table 6-1
Longitudinal Encroachments

Alignment	Waterbody	Approx. Length of Longitudinal Encroachment (ft)
8, 14, 15, 17, & 19	Tributary of Callaway Creek	1000
15	Tributary of Sandy Creek	4500

Note: These lengths are included in the total length of brides in Table 5.1

The estimated number of transverse and longitudinal encroachments varies from 21 for Alignment 17 to 53 encroachments for Alignments 14 and 15. Alignments 8 and 19 have 42 and 31 encroachments, respectively.

Following FDOT's drainage standards, the proposed hydraulic structures and overall roadway drainage features will be designed to cause minimal, if any, changes to flood stages and flood limits in upstream and downstream properties, and to maintain the existing drainage patterns to the fullest extent practical. Potential water quality impacts will be minimal due to adherence to the applicable state regulations. Potential direct impacts to natural features such as fish, plant and wildlife habitat will be mitigated through subsequent design phase permitting. The Wetland Evaluation Report addresses potential direct impacts further. Given that a) there will be minimal changes to flood stages, b) existing drainage patterns will be maintained to the fullest extent practical, c) water quality will be addressed by compliance with state regulations, and d) direct impacts will be mitigated during the design phase, the project will have minimal impacts to natural and beneficial floodplain values.

The detailed hydraulics for crossing the Floodway of Callaway Creek will be evaluated during the design phase when topographic survey is obtained. At that time, FEMA No-Rise procedures will be followed including proper coordination with Bay County. The procedures require using water surface profile computer models to ensure that no water surface increase is created by the

proposed bridge and embankment. Given a no-rise situation, Floodway Map or Flood Insurance Study revisions will not be required.

Bay County and Gulf County representatives were contacted to determine if the project is consistent with existing watershed and floodplain management programs. Both Bay and Gulf County staff indicated that they do not have more restrictive requirements than FEMA for infrastructure projects as this. When it was explained that the project will be designed to FEMA, FDOT, and state regulatory requirements, it was concluded that the project will be consistent with local floodplain management programs. The county agencies are the delegated FEMA representatives for this project so there was no need to discuss further with FEMA. Appendix G contains the correspondence.

The project will promote transportation and associated economic development throughout the area. Some of this future development may occur within the base floodplains. Existing state and local regulations are in place to ensure that adverse affects of floodplain development are avoided; therefore, any future development will be compatible with local floodplain programs. As such, the project is a low risk for supporting incompatible floodplain development.

SECTION 7 CONCLUSION

Proposed cross drains will be designed to pass the 50-year storm event while keeping floodwaters below the travel lanes. Storm events up to and including the 500-year will be analyzed to determine backwater and cross drains will be designed so that there is no significant change in land use values.

All the alignments traverse FEMA-mapped floodplains and un-mapped floodplains associated with small hydraulic crossings. Floodplain elevations will be estimated during final design.

This type of project has the potential to cause changes in flood stage and flood limits, however, proper application of the FDOT cross drain design criteria will ensure that the changes are insignificant.

This project will have a positive effect on emergency services and evacuation as it provides another route to the local communities.

In summary, the hydraulic structures proposed along existing alignments will perform in a manner equal to or better than the existing structure and backwater elevations are not expected to increase. The hydraulic structures proposed along new alignments will be designed to cause minimal changes in flood stages and flood limits. These changes will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant changes in flood risk or damage. The project is a low risk for supporting incompatible floodplain development and will enhance emergency services and evacuations. Therefore, it has been determined that the encroachments associated with this project are not significant.

APPENDICES

Appendix A

FEMA Floodplains and Floodways

FEMA Flood Map Panals Associated with Gulf Coast Parkway Alternative Alignments:

12045C0230F– 9/28/07

12005C0509H– 6/2/09

12045C0210F– 9/28/07

12005C0510H– 6/2/09

12005C0469H– 6/2/09

12005C0468H– 6/2/09

120045C0140F– 9/28/07

12005C0462H– 6/2/09

12005C0452H– 6/2/09

12005C0454H– 6/2/09

12005C0460H– 6/2/09

12045C0110F– 9/28/07

12045C0130F– 9/28/07

12005C0451H– 6/2/09

12005C0432H– 6/2/09

12005C0431H– 6/2/09

12005C0427H– 6/2/09

12045C0040F– 9/28/07

12045C0020F– 9/28/07

12005C0395H– 6/2/09

12005C0390H– 6/2/09

12005C0370H– 6/2/09

12005C0368H– 6/2/09

12005C0364H– 6/2/09

12005C0366H– 6/2/09

12005C0362H– 6/2/09

12005C0358H– 6/2/09

12005C0359H– 6/2/09

12005C0361H– 6/2/09

12005C0380H– 6/2/09

12005C0357H– 6/2/09

12005C0356H– 6/2/09

12005C0352H– 6/2/09

12005C0376H– 6/2/09

12005C0244H– 6/2/09

12005C0243H– 6/2/09

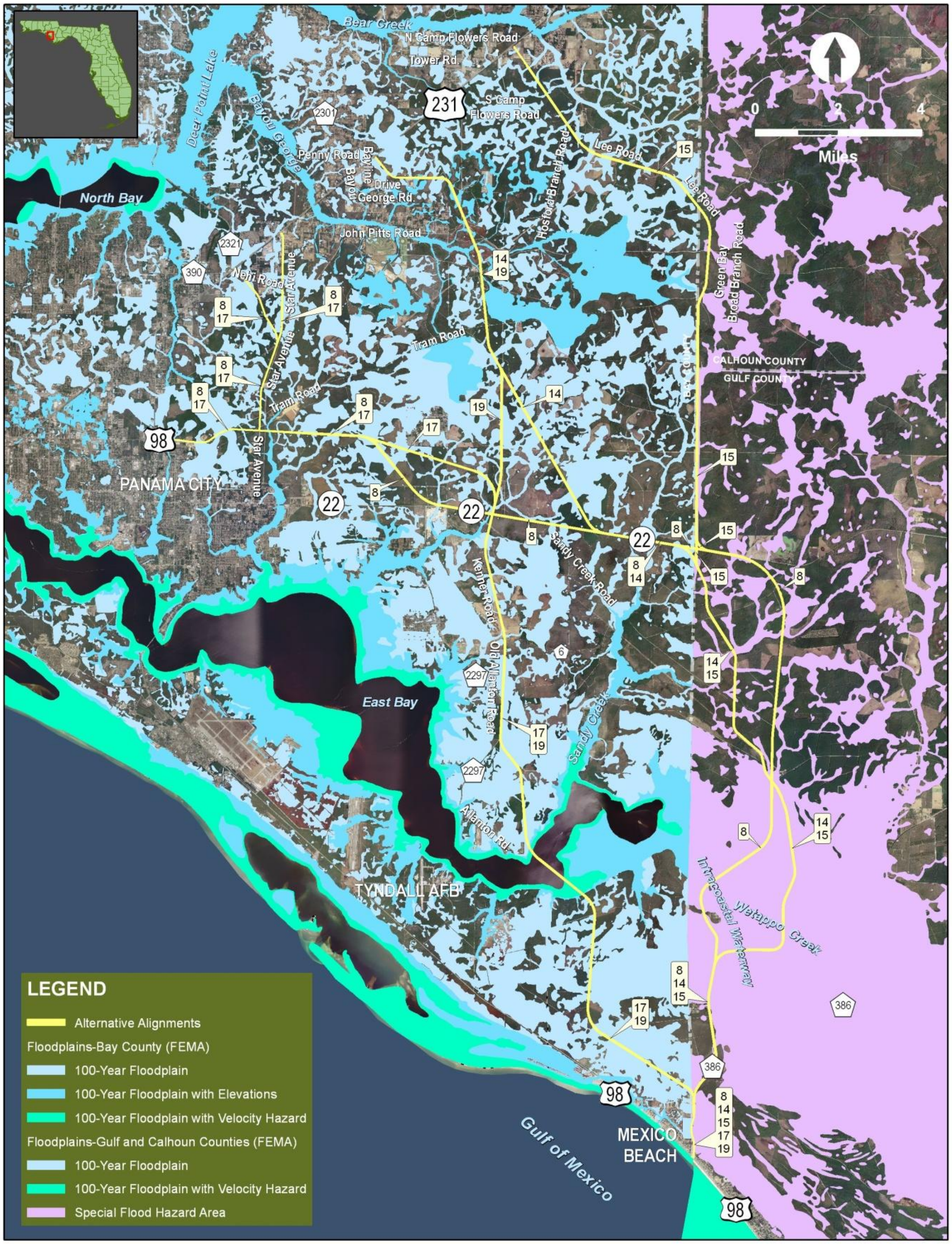
12005C0265H– 6/2/09

12005C0261H– 6/2/09

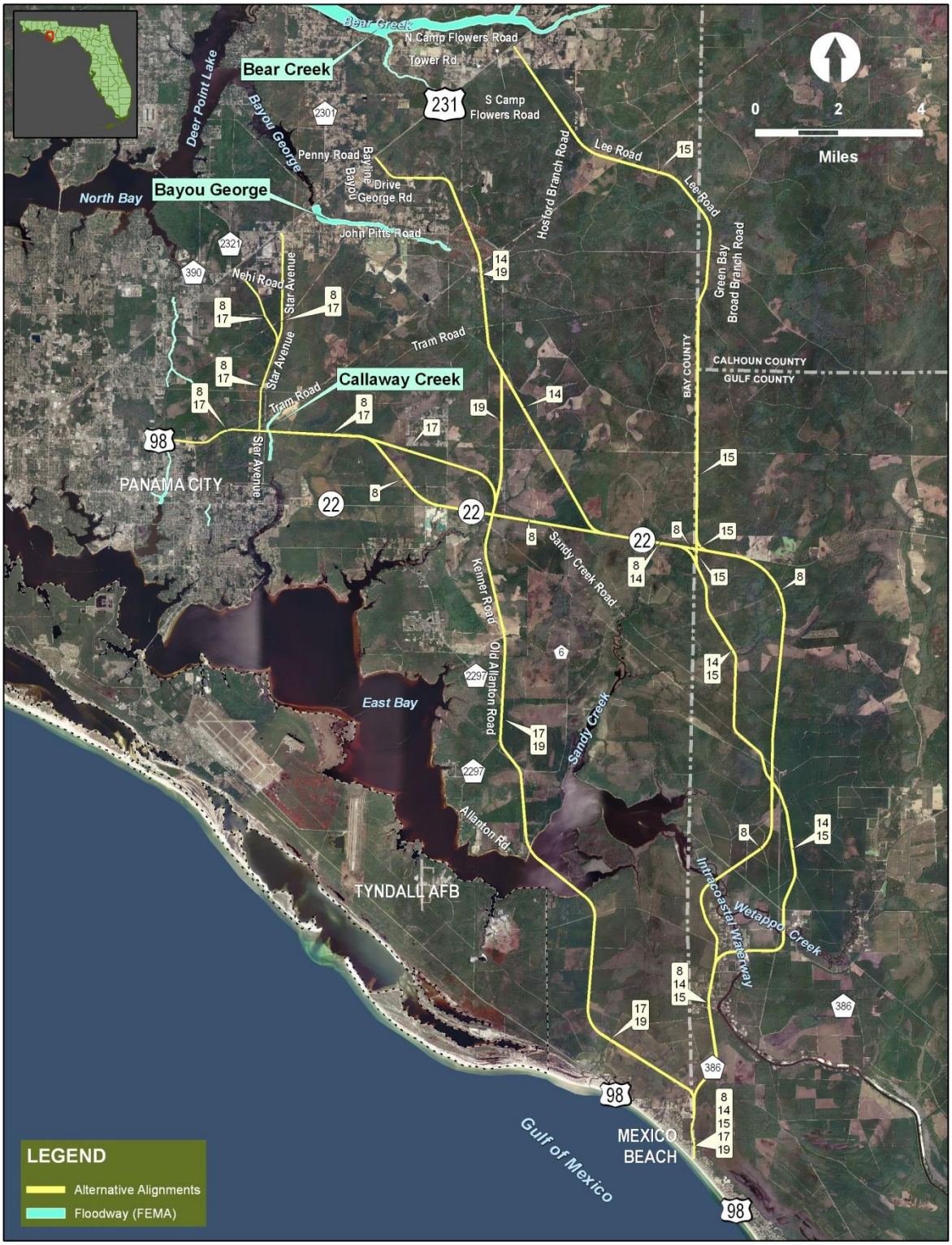
FEMA Flood Insurance Studies (FIS)

Bay County: 12005CV000B (6/22/09)

Gulf County: 12045CV000B (9/28/07)



Bear Creek
N Camp Flowers Road
Tower Rd
S Camp Flowers Road
Lee Road
Miles
0
2
4
North Bay
Deer Point Lake
Bayou George
Penny Road
Bayou George Drive
George Rd
John Pitts Road
Hosford Branch Road
Green Bay
Broad Branch Road
Neff Road
Star Avenue
Tram Road
CALHOUN COUNTY
GULF COUNTY
PANAMA CITY
Sandy Creek Road
Kenmer Road
Old Allanton Road
Sandy Creek
East Bay
Allanton Rd
TYNDALL AFB
Intracoastal Waterway
Wetappo Creek
MEXICO BEACH
Gulf of Mexico
LEGEND
Alternative Alignments
Floodplains-Bay County (FEMA)
100-Year Floodplain
100-Year Floodplain with Elevations
100-Year Floodplain with Velocity Hazard
Floodplains-Gulf and Calhoun Counties (FEMA)
100-Year Floodplain
100-Year Floodplain with Velocity Hazard
Special Flood Hazard Area


Bear Creek
N Camp Flowers Road
Tower Rd.
231
S Camp Flowers Road
Deer Point Lake
Bayou George
Penny Road
Bayline Drive
Bayou George Rd.
North Bay
Bayou George
John Pitts Road
Hosford Branch Road
Lee Road
Lee Road
Green Bay Broad Branch Road
0
2
4
Miles
Nehi Road
Star Avenue
Tram Road
Callaway Creek
Star Avenue
Tram Road
BAY COUNTY
CALHOUN COUNTY
GULF COUNTY
98
PANAMA CITY
Star Avenue
22
22
22
Sandy Creek Road
Kenner Road
Old Allanton Road
East Bay
Sandy Creek
Allanton Rd.
TYNDALL AFB
Intracoastal Waterway
Wetappo Creek
98
MEXICO BEACH
Gulf of Mexico
98
LEGEND
Alternative Alignments
Floodway (FEMA)

Appendix B

Flow Rate Estimates

Gulf Coast Parkway

Location Hydraulic Study

Flow Estimates using the USGS Regression Equation for Region C

The following are only new low level crossings that have drainage areas larger than 590 acres.

The Crossing Number is labeled using the "Segment Number - Unique Identifier in each segment"

$$Q_{50} = 291\ DA^{0.90}\ SL^{0.626}\ (LK+3)^{-1.48}$$

Q_{50} = Peak runoff for 50 year event
DA = Drainage area in square miles
SL = Channel slope between 10 and 85 %of total channel length in ft/mile
LK = Lake area in % of total area

Applicable for 0.92 to 4384 sq. mi for slopes of 1.61 to 78.3 ft/mi and lake area % of 0 to 3.44

Crossing No.	Existing or New?	Drainage Area DA		Chan Slope SL (ft/mi)	Lake % LK	$Q_{50\ (cfs)}$
		Acres	Sq. Mi.			
3-3	New	915	1.43	8.64	0	305
3-4	New	1570	2.45	3.90	0	301
4-4	New	2361.6	3.69	6.02	0	570
9-1	New	636	0.99	6.52	0	184
9-3	New	7670	11.98	3.61	0	1195
10-1	New	2225.50	3.48	8.55	0	673
10-2	New	2269.10	3.55	7.97	0	656
10-3	New	1021.30	1.60	3.86	0	203
16-1	New	1210	1.89	5.26	0	287
19-1	New	1916	2.99	2.99	0	305
20-1	New	1916	2.99	2.99	0	305
21-1	New	1916	2.99	2.99	0	305
21-2	New	788.4	1.23	10.26	0	297
21-2	New	3857.4	6.03	8.46	0	1097
22-1	New	788.4	1.23	10.26	0	297
22-3	New	3857.4	6.03	8.46	0	1097
23-1	New	1916	2.99	2.99	0	305
23-2	New	880	1.38	6.69	0	251
23-3	New	1011	1.58	4.74	0	229
24-2	New	880	1.38	2.99	0	151

File = Flow Calcs.xls, Tab = Regression

Gulf Coast Parkway

Location Hydraulic Study

Flow Estimates using the USGS Regression Equation for Region C

The following are only new low level crossings that have drainage areas larger than 590 acres.

The Crossing Number is labeled using the "Segment Number - Unique Identifier in each segment"

$$Q_{50} = 291\ DA^{0.90}\ SL^{0.626}\ (LK+3)^{-1.48}$$

Q_{50} = Peak runoff for 50 year event
DA = Drainage area in square miles
SL = Channel slope between 10 and 85 %of total channel length in ft/mile
LK = Lake area in % of total area

Applicable for 0.92 to 4384 sq. mi for slopes of 1.61 to 78.3 ft/mi and lake area % of 0 to 3.44

Crossing No.	Existing or New?	Drainage Area DA		Chan Slope SL (ft/mi)	Lake % LK	$Q_{50\ (cfs)}$
		Acres	Sq. Mi.			
24-3	New	1011	1.58	4.74	0	229
30-1	New	1755	2.74	2.15	0	229
30-2	New	1773	2.77	2.84	0	275
35-2	New	2610	4.08	6.29	0	641
36-2	New	1705	2.66	4.34	0	347
37-1	New	12580	19.66	2.87	0	1617
37-2	New	2178	3.40	6.33	0	547
38-2	New	1198	1.87	4.31	0	251
39-3	New	943	1.47	3.94	0	192
40-1	New	1169	1.83	4.62	0	257
40-2	New	2488	3.89	7.71	0	698
40-3	New	2073	3.24	3.06	0	332
40-4	New	2324	3.63	4.13	0	444
41-1	New	556	0.87	2.46	0	89
42-1	New	1456	2.28	6.88	0	401

File = Flow Calcs.xls, Tab = Regression

Appendix C

Technical Approach to Estimating Cross Drain Size

Approach to Estimating Cross Drain Sizes:

The following approach is intended to estimate the number and size of large cross drains for estimating costs and comparing alternative alignments. Since the approach will be applied uniformly to all alternatives, it should provide a reasonable comparison of structure costs for each alternative. This evaluation considers only hydraulic factors. Environmental factors could sometimes necessitate longer structures. Crossings of the ICCW are not part of this approach. A more refined approach may be done after the preferred alignment is selected.

On or near Existing Alignments:

Where alternative alignments match or are within a few hundred feet of existing county or state roads, it is assumed that existing culvert locations and sizes are acceptable unless there is evidence to the contrary.

It is realized that final bridge lengths could be longer or shorter, depending upon wetland limits and topography; specific site conditions will be considered in the bridge hydraulic reports and bridge development reports that document final design.

New Alignments:

In general the lack of topographic survey prevents detailed determinations of culvert locations and sizes. The remoteness of some of the new alignments also makes it unreasonable to field review the locations.

Of primary importance in comparing alternatives is the cost of the large structures. As such this evaluation focuses on relatively large drainage basins that typically would dictate the largest structures. Smaller basins will generally dictate smaller structures that will not have a substantial impact on the costs of a particular alternative and thus should not favor a particular alternative alignment over another. The smallest basin size evaluated will be approximately 590 acres which is the lower limit of the USGS Regression Equation (Region C).

Data:

In most cases topographic data is limited to USGS quadrangle maps. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and aerial images were used to augment the topographic data.

Hydrology:

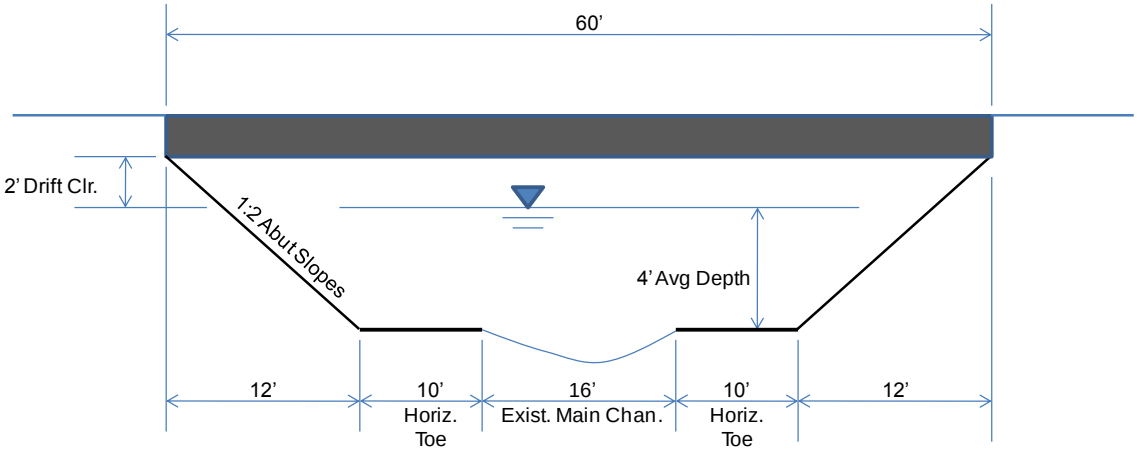
The USGS Regression Equation (Region C) was used for basins approximately 590 acres and larger. Slopes were estimated by interpolation of the contour data.

Only the 50 year flow was determined.

Hydraulics:

After the flow rates were estimated, a cross sectional area of opening was determined based on 2 feet per second(fps) for bridges and 4 fps for culverts. 2 fps is the velocity listed in the FDOT 1996 Cross Drain HB for a trial bridge length. 4 fps is the velocity listed in the 2004 FDOT culvert handbook for trial culvert sizes. After the cross sectional area is determined bridge length is calculated based on an assumed average flow depth of 4 feet unless the topographic data indicates a deeper depth is appropriate. In the case of culverts, a pipe or box configuration is developed that provides the calculated cross sectional area. The height of box culverts was limited to no more than 6 feet unless the topographic data indicated a deeper depth was appropriate. The minimum box culvert height used was 4 feet. Less than 4 feet restricts maintenance access and usually multiple pipe culverts are more economical than shallow box culverts.

For moderate size drainage basins there is a decision whether a bridge or culvert should be used. This decision is formally done during the design phase when detail survey is available. For this report, a minimum bridge size will used and for smaller flows a box culvert or multiple pipe culvert is sized. Unless a smaller bridge exists on an adjacent road, the minimum bridge length is assumed to be 60 feet. This is based on an average flow depth of 4 feet, standard abutment slopes, abutment horizontal toes, and drift clearance, while providing a reasonable a main channel width as shown below.



Assumed Minimum Bridge Length

Similar to the bridges on existing alignments, final bridge lengths on new alignments could be longer or shorter than estimated, depending upon wetland limits and topography; specific site conditions will be considered in the bridge hydraulic reports and bridge development reports that document final design.

As an example of a large basin with obvious need for a bridge, the bridge length would be determined as follows:

Assume the computed flow = 2000 cfs

Area of opening = 2000 cfs/2 fps = 1000 sf

Bridge length = 1000 sf /4 ft = 250 ft.

As an example of a small basin suitable for a culvert, the culvert size would be determined as follows:

Assume the computed flow = 150 cfs

Area of opening = 150 cfs/4 fps = 37.5 sf

Option 1 culvert = 8' x 5' box having 40 sf opening

Option 2 culvert = 3- 48" pipes having 38 sf opening.

Appendix D

Structures by Alternative Alignment

Notes:

1. The structure sizes shown in the comments section were obtained from Straight Line Diagrams from Gulf and Bay Counties.
2. Forty two project segments were used to evaluate potential alignments. The various alignments are comprised of different combinations of segments. The segments comprising an alignment are noted at the top of the tables.
3. The Structure ID is labeled using the "Segment Number – Unique Identifier in each segment." The structures are numbered in file: DRPRRD.dgn located in the project directory: J:\FDOT 2008 Projects\41098122801_ND\drainage.
4. The "sm" notation applies structures with small drainage areas, either too small to warrant measuring or less than 590 acres. Structure sizes were not estimated for these.
5. Structures without "sm" notation generally have drainage areas greater than 590 acres, but a few have smaller drainage areas.

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 8

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
Alignment 8 contains Segments 1 ,3, 8, 10, 14, 15, 17, 21, 25, 26 ,27									
1	1-1	Existing	CR 386	Bridge	58	58' Bridge			58
1	1-2	Exisitng	CR 386	Culvert	3-12x6	US 98 Seg 2 Desdign	1		
1	1-3	Existing	CR 386	Culvert	30"	1- 30" X 61' CC		1	
1	1-4	Existing	CR 386	Bridge	79	79' Bridge			79
1	1-5	Existing	CR 386	Culvert	2-7' x 5'	2-7' X 5' X 53' CBC	1		
3	3-1	Existing	CR 386	Culvert	2-7' x 7'	2-7' X 7' X 47' CBC	1		
3	3-2	New		Bridge	7000'	High Level Bridge over ICCW & Wetappo Crk			
3	3-3	New		Culvert	2-8' x 5'		1		
3	3-4	New		Culvert	2-8' x5'		1		
3	3-1 sm	New		Culvert	</= 54"			1	
8	8-1 sm	New		Culvert	</= 54"			1	
10	10-1 sm	New		Culvert	</= 54"			1	
10	10-2 sm	New		Culvert	</= 54"			1	
10	10-3 sm	New		Culvert	</= 54"			1	
10	10-4 sm	New		Culvert	</= 54"			1	
10	10-1	New		Bridge	84				84
10	10-2	New		Bridge	82				82
10	10-3	New		Bridge	47	47' CB exists on SR 22 near 10-3 crossing			47
10	10-4	Existing	SR 22	Bridge	42	42' CB			42
10	10-5	Existing	SR 22	Culvert	24"	1-24" x 72' CC		1	
14	14-1	Existing	SR 22	Culvert	6' x 3'	6' X 3' X 71' CBC	1		
14	14-2	Existing	SR 22	Culvert	36"	1- 36" X 70' CM		1	
14	14-3	Existing	SR 22	Bridge	300	227' Bridge Exists but has issues			300
14	14-4	Existing	SR 22	Culvert	6' x 4'	6' x 4' x 72' CBC	1		
15	15-1	Existing	SR 22	Culvert	4 x 2	4' x 2' x 65'	1		
15	15-2	Existing	SR 22	Culvert	36"	1-36" x 65' CM		1	
15	15-3	Existing	SR 22	Culvert	4 'x 2'	4' x2' x65' CBC	1		
15	15-4	Existing	SR 22	Bridge	68	68' CB			68
15	15-5	Existing	SR 22	Culvert	6' x 3'	6' X 3' X 66' CBC	1		

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 8

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
15	15-6	Existing	SR 22	Bridge	36	36' CB			36
15	15-7	New		Culvert	</= 54"	Equalizer culvert/box needed (area assumes worst case flow to the NE, but area of the culvert is actually upper end of W.S. for Boggy Crk to the W and Cushion Crk to the E)		1	
17	17-1 sm	New		Culvert	</= 54"	small pipe to connect wetland, not predominant flow.		1	
21	21-1	New		Culvert	2-8' x 5'	19-1, 20-1 and 21-1 are the same crossing	1		
21	21-2	New		Culvert	2-8' x 5'	21-2 and 22-1 are the same crossing	1		
21	21-3	New		Bridge	1000	21-3 and 22-3 are the same crossing (alignment runs parallel to and within branch flow for about 1000'. Proposed bridge length based on this. Slight shift in align would help reduce bridge length)			1000
25	25-1 sm	New		Culvert	</= 54"			1	
25	25-2 sm	New		Culvert	</= 54"	wetland connector		1	
26	26-1 sm	New		Culvert	</= 54"			1	
26	26-2 sm	New		Culvert	</= 54"			1	
27	27-1 sm	New		Culvert	</= 54"	sheet flow (DA is a subset of DA for 23-6 so area is smaller than area of 23-6		1	
27	27-2	New		Culvert	</= 54"			1	
27	27-3	New		Culvert	</= 54"			1	
						Total	12	19	1796

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 14

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
Alignment 14 contains Segments 1, 3, 8, 10, 14, 15, 17, 21, 25, 30, 31, 36, 37, 38									
1	1-1	Existing	CR 386	Bridge	58	58' Bridge			58
1	1-2	Exisitng	CR 386	Culvert	3-12x6	US 98 Seg 2 Desdign	1		
1	1-3	Existing	CR 386	Culvert	30"	1- 30" X 61' CC		1	
1	1-4	Existing	CR 386	Bridge	79	79' Bridge			79
1	1-5	Existing	CR 386	Culvert	2-7' x 5'	2-7' X 5' X 53' CBC	1		
3	3-1	Existing	CR 386	Culvert	2-7x7	2-7' X 7' X 47' CBC	1		
3	3-2	New		Bridge	7000'	High Level Bridge			
3	3-3	New		Culvert	2-8 x 5		1		
3	3-4	New		Culvert	2-8 x5		1		
3	3-1 sm	New		Culvert	</= 54"			1	
8	8-1 sm	New		Culvert	</= 54"			1	
10	10-1 sm	New		Culvert	</= 54"			1	
10	10-2 sm	New		Culvert	</= 54"			1	
10	10-3 sm	New		Culvert	</= 54"			1	
10	10-4 sm	New		Culvert	</= 54"			1	
10	10-1	New		Bridge	84				84
10	10-2	New		Bridge	82				82
10	10-3	New		Bridge	47	47' CB exists on SR 22 near 10-3 crossing		1	47
10	10-4	Existing	SR 22	Bridge	42	42' CB			42
10	10-5	Existing	SR 22	Culvert	24"	1-24" x 72' CC		1	
14	14-1	Existing	SR 22	Culvert	6 x 3	6' X 3' X 71' CBC	1		
14	14-2	Existing	SR 22	Culvert	36"	1- 36" X 70' CM		1	
14	14-3	Existing	SR 22	Bridge	300	227' Bridge Exists but has issues			300
14	14-4	Existing	SR 22	Culvert	6 x 4	6' x 4' x 72' CBC	1		
15	15-1	Existing	SR 22	Culvert	4 x 2	4' x 2' x 65'	1		
15	15-2	Existing	SR 22	Culvert	36"	1-36" x 65' CM		1	
15	15-3	Existing	SR 22	Culvert	4 'x 2'	4' x2' x65' CBC	1		
15	15-4	Existing	SR 22	Bridge	68	68' CB			68
15	15-5	Existing	SR 22	Culvert	6' x 3'	6' X 3' X 66' CBC	1		
15	15-6	Existing	SR 22	Bridge	36	36' CB			36
15	15-7	New		Culvert	</= 54"	Equalizer culvert/box needed (area assumes worst case flow to the NE, but area of the culvert is actually upper end of W.S. for Boggy Crk to the W and Cushion Crk to the E)		1	

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 14

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
17	17-1 sm	New		Culvert	</= 54"	small pipe to connect wetland, not predominant flow.		1	
21	21-1	New		Culvert	2-8 x 5	19-1, 20-1 and 21-1 are the same crossing	1		
21	21-2	New		Culvert	2-8 x 5	21-2 and 22-1 are the same crossing	1		
21	21-3	New		Bridge	1000	21-3 and 22-3 are the same crossing (alignment runs parallel to and within branch flow for about 1000'. Proposed bridge length based on this. Slight shift in align would help reduce BR length)			1000
25	25-1 sm	New		Culvert	</= 54"			1	
25	25-2 sm	New		Culvert	</= 54"	wetland connector		1	
30	30-1	New		Culvert	2-7' x 5'		1		
30	30-1 sm	New		Culvert	</= 54"			1	
30	30-2	New		Culvert	2-7' x 5'		1		
30	30-2 sm	New		Culvert	</= 54"			1	
31	31-1 sm	New		Culvert	</= 54"			1	
31	31-2 sm	New		Culvert	</= 54"			1	
31	31-3 sm	New		Culvert	</= 54"			1	
36	36-1	New		Culvert	</= 54"	Basin is subset of 35-1		1	
36	36-1 sm	New		Culvert	</= 54"			1	
36	36-2	New		Culvert	2-8' x 6'		1		
37	37-1	New		Bridge	205				205
37	37-2	New		Bridge	70				70
38	38-1 sm	New		Culvert	</= 54"			1	
38	38-2 sm	New		Culvert	</= 54"			1	
38	38-2	New		Culvert	2-7' x 5'		1		
						Total	16	24	2071

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 15

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
Alignment 15 contains Segments 1, 3, 8, 10, 12, 14, 15, 17, 21, 25, 40, 41									
1	1-1	Existing	CR 386	Bridge	58	58' Bridge			58
1	1-2	Exisitng	CR 386	Culvert	3-12x6	US 98 Seg 2 Desdign	1		
1	1-3	Existing	CR 386	Culvert	30"	1- 30" X 61' CC		1	
1	1-4	Existing	CR 386	Bridge	79	79' Bridge			79
1	1-5	Existing	CR 386	Culvert	2-7' x 5'	2-7' X 5' X 53' CBC	1		
3	3-1	Existing	CR 386	Culvert	2-7x7	2-7' X 7' X 47' CBC	1		
3	3-2	New		Bridge	7000'	High Level Bridge			
3	3-3	New		Culvert	2-8 x 5		1		
3	3-4	New		Culvert	2-8 x5		1		
3	3-1 sm	New		Culvert	</= 54"			1	
8	8-1 sm	New		Culvert	</= 54"			1	
10	10-1 sm	New		Culvert	</= 54"			1	
10	10-2 sm	New		Culvert	</= 54"			1	
10	10-3 sm	New		Culvert	</= 54"			1	
10	10-4 sm	New		Culvert	</= 54"			1	
10	10-1	New		Bridge	84				84
10	10-2	New		Bridge	82				82
10	10-3	New		Bridge	47	47' CB exists on SR 22 near 10-3 crossing			47
10	10-4	Existing	SR 22	Bridge	42	42' CB			42
10	10-5	Existing	SR 22	Culvert	24"	1-24" x 72' CC		1	
12	None								
14	14-1	Existing	SR 22	Culvert	6 x 3	6' X 3' X 71' CBC	1		
14	14-2	Existing	SR 22	Culvert	36"	1- 36" X 70' CM		1	
14	14-3	Existing	SR 22	Bridge	300'	227' Bridge Exists but has issues			300
14	14-4	Existing	SR 22	Culvert	6 x 4	6' x 4' x 72' CBC	1		
15	15-1	Existing	SR 22	Culvert	4 x 2	4' x 2' x 65'	1		
15	15-2	Existing	SR 22	Culvert	36"	1-36" x 65' CM		1	
15	15-3	Existing	SR 22	Culvert	4 'x 2'	4' x2' x65' CBC	1		
15	15-4	Existing	SR 22	Bridge	68	68' CB			68
15	15-5	Existing	SR 22	Culvert	6' x 3'	6' X 3' X 66' CBC	1		
15	15-6	Existing	SR 22	Bridge	36	36' CB			36

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 15

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
15	15-7	New		Culvert	</= 54"	Equalizer culvert/box needed (area assumes worst case flow to the NE, but area of the culvert is actually upper end of W.S. for Boggy Crk to the W and Cushion Crk to the E)		1	
17	17-1 sm	New		Culvert	</= 54"	small pipe to connect wetland, not predominant flow.		1	
21	21-1	New		Culvert	2-8 x 5	19-1, 20-1 and 21-1 are the same crossing	1		
21	21-2	New		Culvert	2-8 x 5	21-2 and 22-1 are the same crossing	1		
21	21-3	New		Bridge	1000	21-3 and 22-3 are the same crossing (alignment runs parallel to and within branch flow for about 1000'. Proposed bridge length based on this. Slight shift in align would help)			1000
25	25-1 sm	New		Culvert	</= 54"			1	
25	25-2 sm	New		Culvert	</= 54"	wetland connector		1	
40	40-1	New		Culvert	2-7' x 5'		1		
40	40-1 sm	New		Culvert	</= 54"			1	
40	40-2 sm	New		Culvert	</= 54"			1	
40	40-2	New		Bridge	88				88
40	40-3 sm	New		Culvert	</= 54"			1	
40	40-3	New		Bridge	4500	4500' BR. Length set to avoid longitudinal enroachment			4500
40	40-4	New		Culvert	2-10' x 6'		1		
41	41-1 sm	New		Culvert	</= 54"			1	
41	41-2 sm	New		Culvert	</= 54"			1	
41	41-3 sm	New		Culvert	</= 54"			1	
41	41-4 sm	New		Culvert	</= 54"			1	
41	41-1	New		Culvert	2-48" pipes			1	
41	41-5 sm	New		Culvert	</= 54"			1	
41	41-6 sm	New		Culvert	</= 54"			1	
41	41-7 sm	New		Culvert	</= 54"			1	
41	41-8 sm	New		Culvert	</= 54"			1	
						Total	14	26	6384

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 17

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
Alignment 17 contains Segments 2, 16, 18, 21, 25, 26, 27									
2	2A	Existing	CR 386	Bridge	58	58' Bridge (Same as Strct 1-1)			58
2	2-1	New		Bridge	500	Cypress creek Seg 3 US 98 BHR			500
2	2-2	New		Bridge	9100	High Level Bridge over East Bay			
2	2-3	New	Near SR 22	Bridge	68	Existing 68' bridge on SR 22 (Cooks Creek/Oliver Bayou)			68
16	16-1 sm	New		Culvert	</= 54"			1	
16	16-2 sm	New		Culvert	</= 54"			1	
16	16-3 sm	New		Culvert	</= 54"			1	
16	16-1	New		Culvert	12' x 6'		1		
16	16-4 sm	New		Culvert	</= 54"			1	
16	16-5 sm	New		Culvert	</= 54"			1	
18	18-1 sm	New		Culvert	</= 54"	small pipe to connect wetland, not predominant flow.		1	
21	21-1	New		Culvert	2-8' x 5'	19-1, 20-1 and 21-1 are the same crossing	1		
21	21-2	New		Culvert	2-8' x 5'	21-2 and 22-1 are the same crossing	1		
21	21-3	New		Bridge	1000	21-3 and 22-3 are the same crossing (alignment runs parallel to and within branch flow for about 1000'. Proposed bridge length based on this. Slight shift in align would help)			1000
25	25-1 sm	New		Culvert	</= 54"			1	
25	25-2 sm	New		Culvert	</= 54"	wetland connector		1	
26	26-1 sm	New		Culvert	</= 54"			1	
26	26-2 sm	New		Culvert	</= 54"			1	
27	27-1 sm	New		Culvert	</= 54"	sheet flow (DA is a subset of DA for 23-6 so area is smaller than area of 23-6		1	
27	27-2	New		Culvert	</= 54"			1	
27	27-3	New		Culvert	</= 54"			1	
						Total	3	13	1626

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 19

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
Alignment 19 contains Segments 2, 16, 18, 21, 25, 29, 34, 36, 37, 38									
2	2A	Existing	CR 386	Bridge	58	58' Bridge (Same as Strct 1-1)			58
2	2-1	New		Bridge	500	Cypress creek Seg 3 US 98 BHR			500
2	2-2	New		Bridge	9100	High level bridge over East Bay			
2	2-3	New	Near SR 22	Bridge	68	Existing 68' bridge on SR 22 (Cooks Creek/Oliver Bayou)			68
16	16-1 sm	New		Culvert	</= 54"			1	
16	16-2 sm	New		Culvert	</= 54"			1	
16	16-3 sm	New		Culvert	</= 54"			1	
16	16-1	New		Culvert	12 x 6		1		
16	16-4 sm	New		Culvert	</= 54"			1	
16	16-5 sm	New		Culvert	</= 54"			1	
18	18-1 sm	New		Culvert	</= 54"	small pipe to connect wetland, not predominant flow.		1	
21	21-1	New		Culvert	2-8 x 5	19-1, 20-1 and 21-1 are the same crossing	1		
21	21-2	New		Culvert	2-8 x 5	21-2 and 22-1 are the same crossing	1		
21	21-3	New		Bridge	1000	21-3 and 22-3 are the same crossing (alignment runs parallel to and within branch flow for about 1000'. Proposed bridge length based on this. Slight shift in align would help)			1000
25	25-1 sm	New		Culvert	</= 54"			1	
25	25-2 sm	New		Culvert	</= 54"	wetland connector		1	
29	29-1	New		Culvert	</= 54"			1	
29	29-1 sm	New		Culvert	</= 54"			1	
29	29-2 sm	New		Culvert	</= 54"			1	
29	29-3 sm	New		Culvert	</= 54"			1	
29	29-4 sm	New		Culvert	</= 54"			1	
34	34-1 sm	New		Culvert	</= 54"			1	
34	34-2 sm	New		Culvert	</= 54"			1	

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY ALIGNMENT 19

Segment	Structure ID	Existing?	Existing Road	Type	Proposed Size (feet, unless otherwise noted)	Comments	Box Culverts	Cross drains	LL BR Length
36	36-1	New		Culvert	</= 54"	Basin is subset of 35-1		1	
36	36-1 sm	New		Culvert	</= 54"			1	
36	36-2	New		Culvert	2-8' x 6'		1		
37	37-1	New		Bridge	205				205
37	37-2	New		Bridge	70				70
38	38-1 sm	New		Culvert	</= 54"			1	
38	38-2 sm	New		Culvert	</= 54"			1	
38	38-2	New		Culvert	2-7' x 5'		1		
						Total	5	19	1901

Appendix E

Structures by Segment (with Runoff Results)

Notes:

1. The structure sizes shown in the comments section of the tables were obtained from Straight Line Diagrams from Gulf and Bay Counties.
2. The expected cross-sectional area of flow has been computed assuming velocities of 4 fps for culvert crossings and 2 fps at bridge locations.
3. Forty two project segments were used to evaluate potential alignments. The various alignments are comprised of different combinations of segments. The segments comprising an alignment are noted at the top of the tables.
4. The Structure ID is labeled using the "Segment Number – Unique Identifier in each segment." The structures are numbered in file: DRPRRD.dgn located in the project directory: J:\FDOT 2008 Projects\41098122801_ND\drainage.
5. The "sm" notation applies structures with small drainage areas, either too small to warrant measuring or less than 590 acres. Structure sizes were not estimated for these.
6. Structures without "sm" notation generally have drainage areas greater than 590 acres, but a few have smaller drainage areas.

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
1	1-1	Existing	CR 386	Bridge						2	58'	58' Bridge
1	1-2	Exisitng	CR 386	Culvert						4	3-12x6	US 98 Seg 2 Design
1	1-3	Existing	CR 386	Culvert						4	30"	1- 30" X 61' CC
1	1-4	Existing	CR 386	Bridge						2	79'	79' Bridge
1	1-5	Existing	CR 386	Culvert	Gude Br.	1377	2.15	169		4	2-7x5	2-7' X 5' X 53' CBC
										4		
2	2A	Existing	CR 386	Bridge						2	58'	58' Bridge (same as Strct 1-1)
2	2-1	New		Bridge	Cypress Creek					2	500	Cypress creek Seg 3 US 98 BHR
2	2-2	New		Bridge	East Bay					2	9100	High level bridge over East Bay
2	2-3	New	Near SR 22	Bridge	Cook/Olivers Crk					2	68'	Existing 68' bridge on SR 22 (Cooks Creek/Oliver Bayou)
										4		
3	3-1	Existing	CR 386	Culvert	Joe Lamb Br	2670	4.17	196		4	2-7x7	2-7' X 7' X 47' CBC
3	3-2	New		Bridge	ICCW / Wetappo Crk					2	7000'	High Level Bridge
3	3-3	New		Culvert	Horseshoe Crk	915	1.43	305	76.25	4	2-8 x 5	
3	3-4	New		Culvert	Horseshoe Crk	1570	2.45	301	75.25	4	2-8 x5	
	3-1 sm	New		Culvert						4	</= 54"	
										4		
4	4-1	Existing	CR 386	Culvert	Joe Lamb Br	2670	4.17	196		4	2-7x7	2-7' X 7' X 47' CBC
4	4-2	Existing	CR 386	Bridge	ICCW					2	7000'	High Level Bridge
4	4-3	New		Bridge	Wetappo Crk					2	7000'	High Level Bridge
4	4-1 sm	New		Culvert						4	</= 54"	
4	4-2 sm	New		Culvert						4	</= 54"	
4	4-3 sm	New		Culvert						4	</= 54"	
4	4-4	New		Bridge		2362	3.69	519	260	2	65'	
										4		
5	5-1 sm	New		Culvert						4	</= 54"	

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
										4		
6										4		
										4		
7	7-1 sm	New		Culvert						4	</= 54"	
										4		
8	8-1 sm	New		Culvert						4	</= 54"	
										4		
9	9-1	New		Culvert		636	1.00	184	46	4	8 x 6	
9	9-1 sm	New		Culvert						4	</= 54"	
9	9-2	New		Culvert		485	0.76			4	</= 54"	
9	9-2 sm	New		Culvert						4	</= 54"	
9	9-3	New		Bridge		7670	11.98	1195	568	2	142'	
										4		
10	10-1 sm	New		Culvert						4	</= 54"	
10	10-2 sm	New		Culvert						4	</= 54"	
10	10-3 sm	New		Culvert						4	</= 54"	
10	10-4 sm	New		Culvert						4	</= 54"	
10	10-1	New		Bridge	Little Sandy Crk	2226	3.48	673	337	2	84'	
10	10-2	New		Bridge	Britt Branch	2269	3.55	656	328	2	82'	
10	10-3	New		Bridge	Wildcat Swamp	1021	1.6	203	102	2	47'	47' CB exists on SR 22 near 10-3 crossing
10	10-4	Existing	SR 22	Bridge						2	42'	42' CB
10	10-5	Existing	SR 22	Culvert						4	24"	1-24" x 72' CC
										4		
11	11-1 sm	New		Culvert						4	</= 54"	
11	11-2	Existing	SR 22	Culvert						4	36"	1- 36" X 70' CM
11	11-3	Existing	SR 22	Bridge	Sandy Crk	13915	21.74	2387	1194	2	300'	227' Bridge Exists but has issues
11	11-4	Existing	SR 22	Culvert						4	6 x 4	6' x 4' x 72' CBC
										4		

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
12	None									4		
										4		
13	13-1 sm	New		Culvert						4	</= 54"	
										4		
14	14-1	Existing	SR 22	Culvert						4	6 x 3	6' X 3' X 71' CBC
14	14-2	Existing	SR 22	Culvert						4	36"	1- 36" X 70' CM
14	14-3	Existing	SR 22	Bridge	Sandy Crk	13915	21.74	2387	1194	2	300'	227' Bridge Exists but has issues
14	14-4	Existing	SR 22	Culvert						4	6 x 4	6' x 4' x 72' CBC
										4		
15	15-1	Existing	SR 22	Culvert						4	4 x 2	4' x 2' x 65'
15	15-2	Existing	SR 22	Culvert						4	36"	1-36" x 65' CM
15	15-3	Existing	SR 22	Culvert						4	4 x 2	4' x2' x65' CBC
15	15-4	Existing	SR 22	Bridge	Olivers Crk	10364	16.19	1949		2	68'	68' CB
15	15-5	Existing	SR 22	Culvert						4		6' X 3' X 66' CBC
15	15-6	Existing	SR 22	Bridge	Cushion Crk	1851	2.89	540	270	2	36	36' CB
15	15-7	New		Culvert		409				4	</= 54"	Equalizer culvert/box needed (area assumes worst case flow to the NE, but area of the culvert is actually upper end of W.S. for Boggy Crk to the W and Cushion Crk to the E)
										4		
16	16-1 sm	New		Culvert						4	</= 54"	
16	16-2 sm	New		Culvert						4	</= 54"	
16	16-3 sm	New		Culvert						4	</= 54"	
16	16-1	New		Culvert		1210	1.89	287	72	4	12 x 6	
16	16-4 sm	New		Culvert						4	</= 54"	
16	16-5 sm	New		Culvert		291				4	</= 54"	
										4		
17	17-1 sm	New		Culvert						4	</= 54"	small pipe to connect wetland, not predominant flow.

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
										4		
18	18-1 sm	New		Culvert						4	</= 54"	small pipe to connect wetland, not predominant flow.
										4		
19	19-1 sm	New		Culvert						4		
19	19-1	New		Culvert		1916	2.99	305	76	4	2-8 x 5	19-1, 20-1 and 21-1 are the same crossing
										4		
20	20-1 sm	New		Culvert						4	</= 54"	
20	20-1	New		Culvert		1916	2.99	305	76	4	2-8 x5	19-1, 20-1 and 21-1 are the same crossing
										4		
21	21-1	New		Culvert		1916	2.99	305	76	4	2-8 x 5	19-1, 20-1 and 21-1 are the same crossing
21	21-2	New		Culvert		788	1.23	297	74	4	2-8 x 5	21-2 and 22-1 are the same crossing
21	21-3	New		Bridge	Callaway Crk	3857	6.03	1097	549	2	1000	21-3 and 22-3 are the same crossing (alignment runs parallel to and within branch flow for about 1000'. Proposed bridge length based on this. Slight shift in align would help)
										4		
22	22-1	New		Culvert		788	1.23	297	74	4	2-8 x 5	21-2 and 22-1 are the same crossing
22	22-3	New		Bridge	Callaway Crk	3857	6.03	1097	549	2	1000	21-3 and 22-3 are the same crossing (alignment runs parallel to and within branch flow for about 1000'. Proposed bridge length based on this. Slight shift in align would help)
										4		
23	23-1	New		Culvert		1916	2.99	305	76	4	2-8 x 5	Close proximity to 19-1
23	23-1 sm	new		Culvert		60				4	</= 54"	
23	23-2 sm	New		Culvert		60				4	</= 54"	
23	23-2	New		Culvert	Callaway Crk	880	1.38	251	63	4	2-7 x 5	23-2 and 24-2 are the same crossing
23	23-3 sm	New		Culvert						4	</= 54"	
23	23-3	New		Culvert	Lawton Branch	1011	1.58	229	57	4	2-6 x 5	23-3 and 24-3 are the same crossing
23	23-4	New		Culvert		530				4	</= 54"	

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
23	23-4 sm			Culvert						4	</= 54"	
23	23-5	New		Culvert		<485				4	</= 54"	DA is a subset of DA for 23-6 so area is smaller than area of 23-6
23	23-6	New		Culvert		485				4	</= 54"	
										4		
24	24-1 sm	new		Culvert		60				4	</= 54"	
24	24-2 sm	New		Culvert		60				4	</= 54"	
24	24-2	New		Culvert	Callaway Crk	880	1.38	151	38	4	2-7 x 5	23-2 and 24-2 are the same crossing
24	24-3 sm	New		Culvert						4	</= 54"	
24	24-3	New		Culvert	Lawton Branch	1011	1.58	229	57	4	2-6 x 5	23-3 and 24-3 are the same crossing
24	24-4	New		Culvert		530				4	</= 54"	
24	24-4 sm	new		Culvert						4	</= 54"	sheet flow (DA is a subset of DA for 23-6 so area is smaller than area of 23-6
24	24-5	New		Culvert		<485				4	</= 54"	
24	24-6	New		Culvert		485				4	</= 54"	
										4		
25	25-1 sm	New		Culvert						4	</= 54"	
25	25-2 sm	New		Culvert						4	</= 54"	wetland connector
										4		
26	26-1 sm			Culvert						4	</= 54"	
26	26-2 sm			Culvert						4	</= 54"	
										4		
27	27-1 sm	New		Culvert						4	</= 54"	sheet flow (DA is a subset of DA for 23-6 so area is smaller than area of 23-6
27	27-2	New		Culvert		<485				4	</= 54"	
27	27-3	New		Culvert		485				4	</= 54"	
										4		
28	28-1 sm			Culvert						4	</= 54"	

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
28	28-2 sm			Culvert						4	</= 54"	
28	28-3 sm			Culvert						4	</= 54"	
28	28-4 sm			Culvert						4	</= 54"	
28	28-5 sm			Culvert						4	</= 54"	
										4		
29	29-1	New		Culvert						4	</= 54"	
29	29-1 sm	New		Culvert						4	</= 54"	
29	29-2 sm	New		Culvert						4	</= 54"	
29	29-3 sm	New		Culvert						4	</= 54"	
29	29-4 sm	New		Culvert						4	</= 54"	
										4		
30	30-1	New		Culvert		1755	2.74	229	57	4	2-7 x 5	
30	30-1 sm	New		Culvert						4	</= 54"	
30	30-2	New		Culvert		1773	2.77	275	69	4	2-7 x 5	
30	30-2 sm	New		Culvert						4	</= 54"	
										4		
31	31-1 sm	New		Culvert						4	</= 54"	
31	31-2 sm	New		Culvert						4	</= 54"	
31	31-3 sm	New		Culvert						4	</= 54"	
										4		
32	32-1 sm	New		Culvert						4	</= 54"	
32	32-2 sm	New		Culvert						4	</= 54"	
										4		
33	33-1 sm	New		Culvert						4	</= 54"	
33	33-2 sm	New		Culvert						4	</= 54"	
										4		
34	34-1 sm	New		Culvert						4	</= 54"	

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

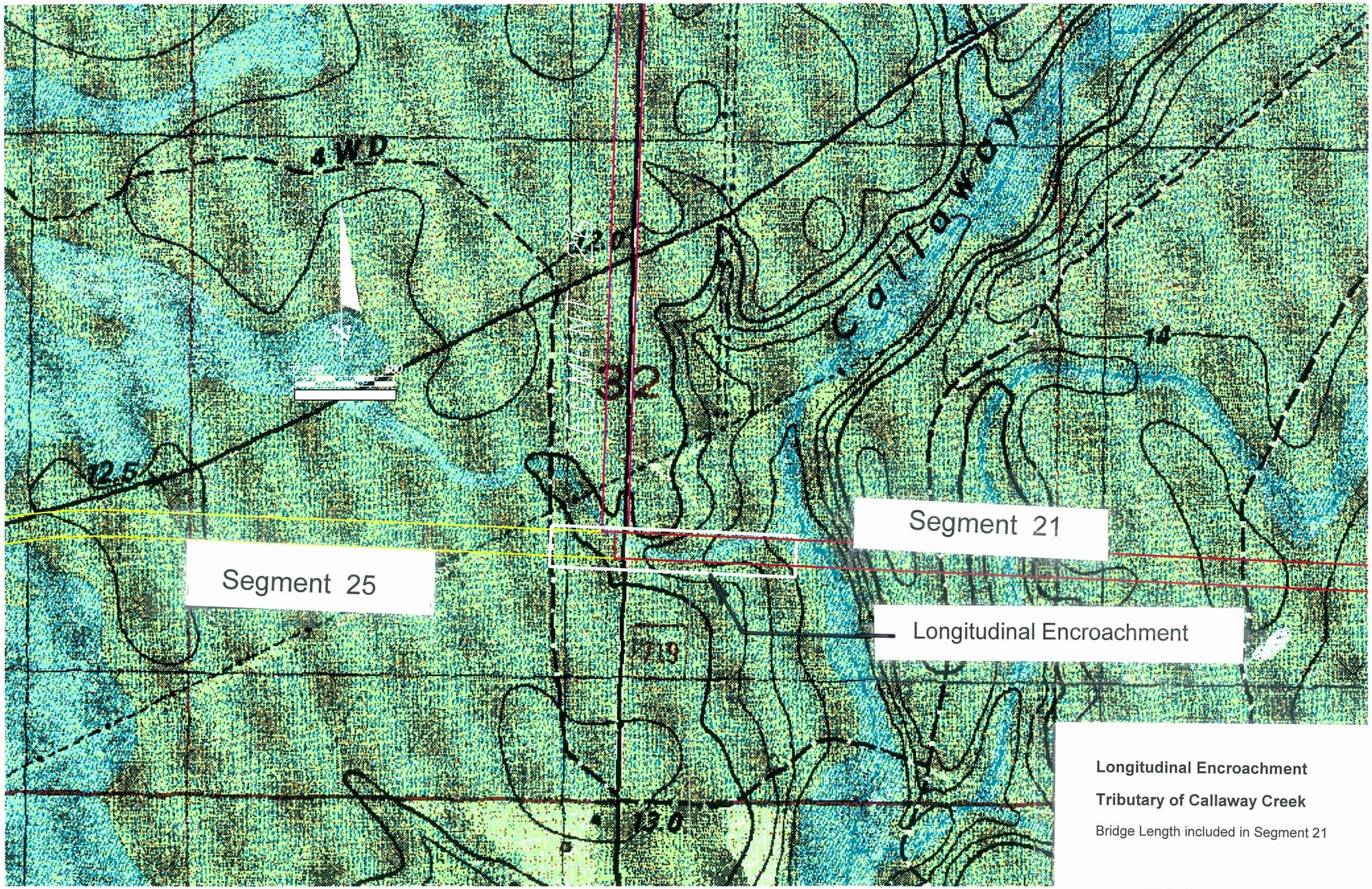
Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
34	34-2 sm	New		Culvert						4	</= 54"	
										4		
35	35-1	New		Culvert		466				4	</= 54"	
35	35-1 sm	New		Culvert						4	</= 54"	
35	35-2 sm	New		Culvert						4	</= 54"	
35	35-2	New		Bridge	Big Branch	2610	4.08	641	321	2	80	
										4		
36	36-1	New		Culvert		<466				4	</= 54"	Basin is subset of 35-1, thus smaller than 466 but 466 was used.
36	36-1 sm	New		Culvert						4	</= 54"	
36	36-2	New		Culvert		1705	2.66	347	87	4	2-8x 6	
										4		
37	37-1	New		Bridge	Bayou George & Island Branch	12580	19.66	1617	809	2	205	
37	37-2	New		Bridge	Beefwood Branch	2178	3.4	547	274	2	70	
										4		
38	38-1 sm	New		Culvert						4	</= 54"	
38	38-2 sm	New		Culvert						4	</= 54"	
38	38-2	New		Culvert		1198	1.87	257	64	4	2-7 x 5	
										4		
39	39-1 sm	New		Culvert						4	</= 54"	
39	39-2 sm	New		Culvert						4	</= 54"	
39	39-3 sm	New		Culvert						4	</= 54"	
39	39-3	New		Culvert		943	1.47	192	48	4	8 x 6	
										4		
40	40-1	New		Culvert		1169	1.83	257	64	4	2-7 x 5	
40	40-1 sm	New		Culvert						4	</= 54"	
40	40-2 sm	New		Culvert						4	</= 54"	
40	40-2	New		Bridge		2488	3.89	698	349	2	88	

CULVERT AND BRIDGE CROSSINGS
GULF COAST PARKWAY
SEGMENTS

Segment	Structure ID	Existing?	Existing Road	Type Bridge or Culvert	WaterBody	Basin Area (acres)	Basin Area (mi^2)	Q_{50} (cfs)	Proposed Cross-Sectional Area of Flow (sf)	Velocity Used (fps)	Proposed Size (feet, unless otherwise noted)	Comments
40	40-3 sm	New		Culvert						4	</= 54"	
40	40-3	New		Bridge	Sandy Creek	2073	3.06	332	166	2	4500	4500' BR. Length set to avoid longitudinal enroachment
40	40-4	New		Culvert	Headwaters Bayou George	2324	3.63	444	111	4	2-10 x 6	
										4		
41	41-1 sm	New		Culvert						4	</= 54"	
41	41-2 sm	New		Culvert						4	</= 54"	
41	41-3 sm	New		Culvert						4	</= 54"	
41	41-4 sm	New		Culvert						4	</= 54"	
41	41-1	New		Culvert		556	0.87	89	22	4	2-48" pipes	
41	41-5 sm	New		Culvert						4	</= 54"	
41	41-6 sm	New		Culvert						4	</= 54"	
41	41-7 sm	New		Culvert						4	</= 54"	
41	41-8 sm	New		Culvert						4	</= 54"	
										4		
42	42-1 am	New		Culvert						4	</= 54"	
42	42-2 sm	New		Culvert						4	</= 54"	
42	42-1	New		Culvert		1456	2.28	401	100	4	2-10 x 5	
42	42-3 sm	New		Culvert						4	</= 54"	
42	42-4 sm	New		Culvert						4	</= 54"	
42	42-5 sm	New		Culvert						4	</= 54"	
42	42-6 sm	New		Culvert						4	</= 54"	
42	42-7 sm	New		Culvert						4	</= 54"	
42	42-8 sm	New		Culvert						4	</= 54"	

Appendix F

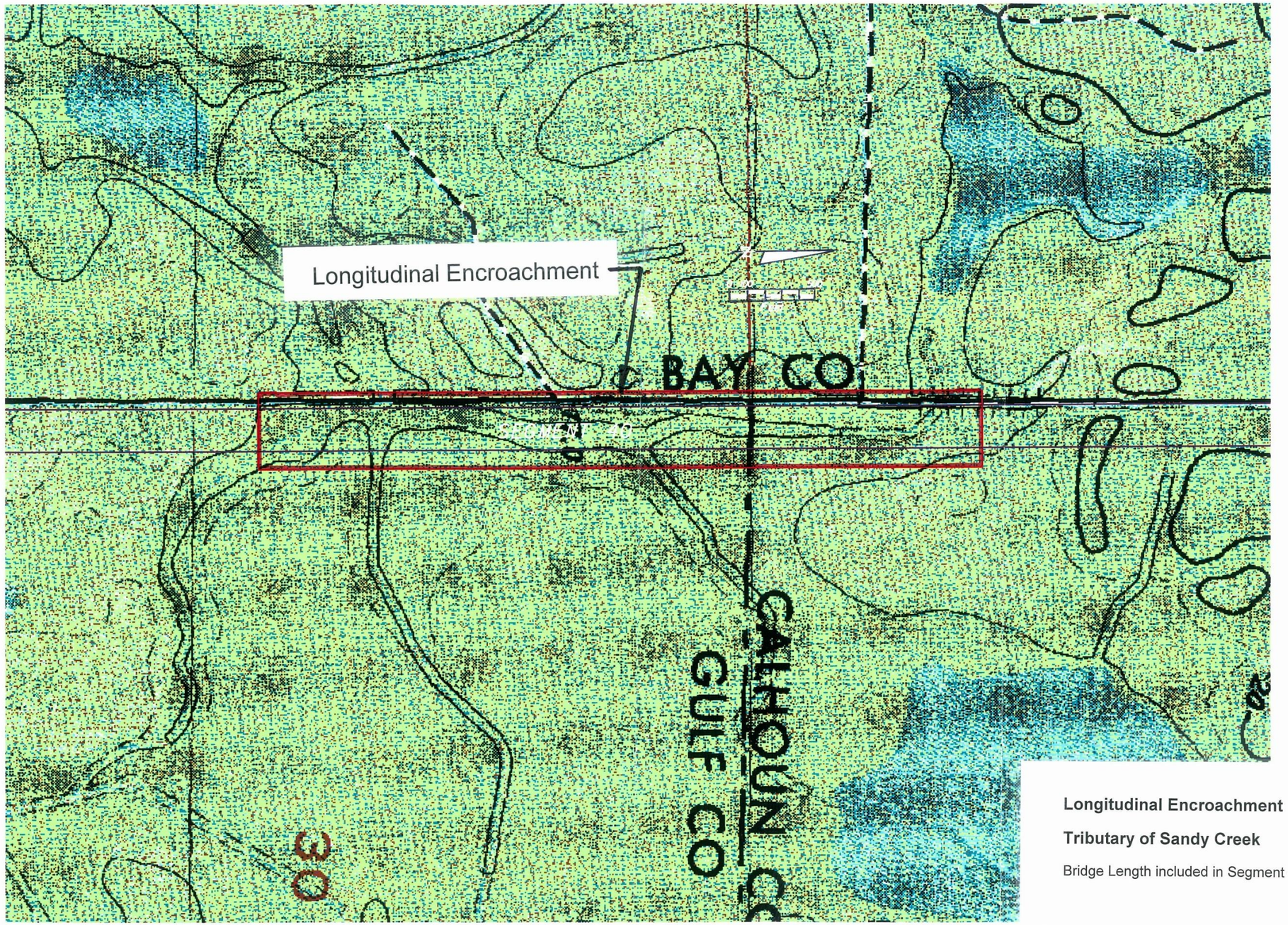
Longitudinal Encroachments



Longitudinal Encroachment

Tributary of Callaway Creek

Bridge Length included in Segment 21



Longitudinal Encroachment

Tributary of Sandy Creek

Bridge Length included in Segment 40

Appendix G

Correspondence

- FDOT Maintenance Panama City, RE: Existing Drainage Issues
- Gulf County Planning, RE: Floodplains
- Bay County Planning, RE: Floodplains

FDOT Maintenance

Hack, Christopher R

From: Joiner, Chiquita [Chiquita.Joiner@dot.state.fl.us]
Sent: Tuesday, August 25, 2009 11:28 AM
To: Brewton, Harvey; Hack, Christopher R
Cc: Brown, Wade; Wittkopf, Michael; McQuagge, Roy; Hogan, Gary
Subject: SR 22 Any Existing drainage issues?

Sent in behalf of Harvey Brewton

The only location in Bay County is at Sandy Creek. The Gulf County is maintained by Transfield Services. The contact person will be Chad Wood and phone numbers are; office /850-697-9411, cell / 850-544-4024. He can also be reached via email; woodc@transfieldservices.com.
If we can of any further assistance please feel free to contact us.

Chiquita Joiner

Senior Clerk
Panama City Operations
Office (850)767-4910
Fax (850)767-4941
Mobile (850)596-5224

From: Hack, Christopher R
To: Brewton, Harvey
Cc: Serra, Amanda P
Sent: Tue Aug 25 08:16:41 2009
Subject: SR 22 Any Existing drainage issues?
Harvey:

Hope all is going well with you Captain.

We are working on a PDE project called the Gulf Coast Parkway. You have probably heard of it. It will start at CR 386 at the Gulf/Bay county line and end at US 231. Numerous alignments are being considered, several of which are along portions of SR 22.

Have you had any experience of SR 22 overtopping or other indications that the culverts or bridges need to be upsized? Or where there should be a culvert but there is not.

The section we are interested in is from approximately MP 7 (which is west of Cushion Creek and CR 2297) to approximately 2 miles east of the Bay County line.

It is my understanding that you do not maintain Gulf County. If so, can you give me a name and number of person overseeing that.

Once again... hope all is going well.

Chris Hack, P.E.
Senior Engineer III
PBS&J
2639 N. Monroe Street, Bldg. C
Tallahassee, FL 32303-4027

From: David Richardson
To: Hack, Christopher R
Subject: RE: Gulf Coast Parkway - Local Floodplain Programs
Date: Tuesday, July 02, 2013 11:07:18 AM

Sounds good to me.

David Richardson
Gulf County BOCC
Planner
1000 Cecil G. Costin Sr. Blvd.
Port St. Joe, FL 32456
(850) 227-9562
http://www.gulfcounty-fl.gov/PlanningDepartment.cfm

From: Hack, Christopher R [mailto:Christopher.Hack@atkinsglobal.com]
Sent: Tuesday, July 02, 2013 10:09 AM
To: drichardson@gulfcounty-fl.gov
Subject: Gulf Coast Parkway - Local Floodplain Programs

David:

Thanks for talking with me yesterday. I was planning to document our conversation with the following text. Please let me know if this needs editing.

---

23 CRF 650 requires that as a part of location hydraulic studies, local agencies be contacted to determine if the proposed highway action is consistent with existing watershed and floodplain management programs.

I discussed this with David Richardson who heads the Gulf County Flood Protection and Planning Department. Mr. Richardson said their primary focus was on residential development and that in general there was no restriction to roads other than the appropriate use of culverts to allow floodwaters to pass under the road with backing up. He said that Gulf County did not have a floodplain program that was more restrictive than FEMA requirements. He noted that it is difficult to actually approve the project without more specific details typically known only during the design phase.

I explained that the project will be designed to FEMA, FDOT, and state regulatory requirements and will be noted as such in the Location Hydraulic Report and related Preliminary Engineering documents. These agencies have requirements addressing the use of culverts to allow floodwaters to pass under the road with backing up. Given this fact and that Gulf County does not have more restrictive requirements than FEMA; I conclude that the project will be consistent with Gulf County's floodplain management program.

Chris Hack, PE

From: Wayne Porter
To: Hack, Christopher R
Cc: Martin Jacobson
Subject: RE: Gulf Coast Parkway, From Mexico Beach to US 231 - Local Floodplain Programs
Date: Wednesday, July 10, 2013 12:38:04 PM

Chris,

This looks correct. Will the County have an opportunity to look at the preliminary engineering and hydraulic studies when they are prepared?

Here is the link to our flood ordinance...

http://media.baycoclerk.com/Media/Minutes/Mins//Bay%20FL/Ordinance/2013-07-02%20Ordinance%2013-22%20Amend%20Bay%20County%20Code%20to%20Repeal%20and%20Adopt%20a%20New%20Chapter%209%20Drainage,%20Article%20II,%20Floodplains.pdf

Thanks,

Wayne Porter
Planner/CRS Coordinator
Bay County Planning & Zoning
850-248-8258
wporter@baycountyfl.gov

From: Hack, Christopher R [mailto:Christopher.Hack@atkinsglobal.com]
Sent: Tuesday, July 09, 2013 4:23 PM
To: Wayne Porter
Subject: Gulf Coast Parkway, From Mexico Beach to US 231 - Local Floodplain Programs

Wayne:

Thanks for talking with me earlier. I was planning to document our conversation with the following text. Please let me know if this needs editing.

---

23 CRF 650 requires that as a part of location hydraulic studies, local agencies be contacted to determine if the proposed highway action is consistent with existing watershed and floodplain management programs.

I discussed Gulf Coast Parkway with Wayne Porter, of the Bay County Planning and Zoning Department. Mr. Porter said that Bay County's floodplain program is based off a State model that has been approved by FEMA. He said there is nothing more restrictive in Bay County's Ordinance than the standard FEMA requirements regarding infrastructure projects such as this.

I explained that the project will be designed to FEMA, FDOT, and state regulatory requirements. This will be noted as such in the Gulf Coast Parkway Location Hydraulic Report and related preliminary engineering documents. Given that Bay County does not have more restrictive requirements than FEMA, I conclude that the project will be consistent with Bay County's floodplain management program.

For my future reference, please send me the latest floodplain ordinance at your convenience.

Chris Hack, PE
Senior Engineer III, Transportation Division

ATKINS
2639 N. Monroe Street, Bldg. C, Tallahassee, FL 32303-4027 | Tel: (850) 575 1800 | Direct: (850) 580 7963 | Fax: (850) 575 1083
Email: christopher.hack@atkinsglobal.com | Web: www.atkinsglobal.com/northamerica www.atkinsglobal.com